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Part II

# Department of Energy

## Residential Conservation Service Program

**DEPARTMENT OF ENERGY**

**10 CFR Part 456**

**[Docket No. CAS-RM-79-101]**

## Residential Conservation Service Program

**AGENCY:** Department of Energy.

**ACTION:** Final rule.

**SUMMARY:** The Department of Energy (DOE) is implementing the Residential Conservation Service (RCS) Program pursuant to Part 1 of Title II of the National Energy Conservation Policy Act (NECPA), Pub. L. No. 95-619, 92 Stat. 3206, *et seq.* The purpose of the Program is to encourage the installation of energy conservation measures, including renewable resource measures, in existing houses by residential customers of larger gas and electric utilities as well as home heating suppliers. The final rule sets out the requirements for State Plans and Nonregulated Utility Plans which contain requirements for utilities and home heating suppliers in administering their RCS programs. In addition, the rule addresses certain prohibitions, and exceptions thereto, concerning utilities' supply, installation, and financing of energy conservation measures, and it outlines the situations and terms under which Federal Standby Authority would be exercised. The rule also contains material and installation standards for measures installed under the RCS program.

**EFFECTIVE DATE:** December 7, 1979.

**FOR FURTHER INFORMATION CONTACT:**

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**SUPPLEMENTARY INFORMATION:**

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### I. Introduction

On March 19, 1979, the Department of Energy (DOE) published a proposed rule (44 FR 16546) to establish the Residential Conservation Service (RCS) Program to encourage and facilitate the installation of energy conservation measures and renewable resource measures.

DOE received 443 written comments on the proposed rulemaking and 415 individuals testified at the public hearings held in April and May at eight locations throughout the United States. An additional hearing was held in August on the Draft Regulatory Analysis, Draft Environmental Impact Statement and Draft Urban and Community Impact Assessment.

Virtually all the commenters supported the aims of Title II of the National Energy Conservation Policy Act (NECPA), and many suggestions were made that resulted in changes in the Final Rule. With the issuance of this Final Rule, the Department of Energy amends Chapter II of Title 10 CFR by adding a new Part 456 to establish a RCS Program, pursuant to Title II, Part I of the National Energy Conservation Policy Act, Pub. L. No. 95-619.

During the public comment period, DOE at numerous times pointed out that it means the Proposed Rule to be just that, a proposal. It emphasized that, subject to the provisions of NECPA, DOE was prepared when presented with facts or reasoned arguments to reconsider its proposals. The Final Rule demonstrates that DOE has attempted to accommodate legitimate concerns raised by the public. DOE's chief concerns in its review of the public record were:

(1) Providing for an effective RCS Program; and

(2) Carrying out its responsibilities under NECPA.

For those who commented that DOE should provide only general guidance, there may be disappointment in the Final Rule. However, the legislation has detailed requirements which do not lend themselves to "general guidance." For those who recognized the constraints of the legislation and argued the merits of one approach over another approach in terms of achieving Program effectiveness, there is likely to be some satisfaction.

In many instances, the Rule has been changed to reflect the comments received, particularly those comments which explained the basis for comment. Many comments, however, addressed themselves not to the requirements in the Proposed Rule but to the requirements of NECPA itself. Also, many comments were based on a misreading of the Proposed Rule. In these cases, DOE has attempted to clarify the Final Rule language. For those who took the time to provide reasoned alternatives under the law, especially when supported with data or factual material, DOE thanks you.

In its review of the comments and subsequent preparation of the Final Rule, DOE carefully reexamined costs and, where possible, altered the requirements of the Rule to lower those costs. In addition, DOE reevaluated the flexibility in its Proposed Rule and, in some cases, provided additional flexibility. To cite all the changes in this introduction is not possible, but a few examples can serve to illustrate:

- The post-installation inspection requirement was reduced in both its coverage of Program measures and the degree to which it applies while still providing the necessary assurances of proper installation procedures;
- Although the Program Announcement and in-person delivery of audit results provisions were retained, DOE has reexamined the costs and effectiveness of these requirements and has provided flexibility for the States to pose alternatives to them in their State Plans;
- The material and installation standards were reevaluated based on the need for safety and/or effectiveness and, as a result, reduced in scope and coverage;
- The "front-end" problems associated with NECPA's requirement that customers receive the offer to audit, etc., within six months of State Plan approval were considered, and an approach allowing the scheduling of energy audits by geographic area or energy use was adopted;
- States are allowed to add measures to the Program so that individual State needs can be met;
- Class B audits continue to be allowed, but quality assurance requirements have been added for Class B audits offered in conjunction with the RCS Program;
- One audit of all Program measures (conservation and renewable resource) has been prescribed, which should reduce the costs of providing audits.
- An applicability of measures test has been added to the audit procedure to ensure only those Program measures appropriate to the customer are considered in the audit, which should also reduce audit costs;

• DOE, recognizing the burden on the State in implementing the RCS Program, has separately requested that Congress provide funds for State grants in the proposed Energy Management Partnership Act;

• Separate billing apart from the utility or home heating supplier periodic bill is allowed, thus eliminating the costs of changing computer programs or billing formats;

• Information concerning do-it-yourself installation of measures has been added to the energy audit to provide customers with a cost-effective alternative to contractor installations; and

• The attention to energy conservation practices (low-cost and no-cost actions) has been expanded. Eligible customers receiving energy audits are advised to implement these practices before installing energy conservation or renewable resource measures.

Finally, a most important area of flexibility remains unchanged from the Proposed Rule—when the Rule does not prohibit or require something or subject something to explicit conditions, the States and/or utilities and home heating suppliers are free to develop their programs in the manner that suits their needs and desires.

A number of sections of the Final Rule are reserved. For the most part, the reserved sections are in the Standards Subparts G, H, and I and in the section dealing with qualifications of installers and inspectors of certain measures (Section 456.314). DOE will shortly issue a Proposed Rule, which will address the reserved portions of this Final Rule. A sixty day public comment period, including a public hearing is planned. DOE has determined that standards are necessary for general safety and effectiveness for the measures where reserved sections appear. Consequently, if final standards are not issued by the Department prior to the approval of a State Plan, the measure will not be included in that State's RCS Program and no information on the measure may appear in the Program Announcement or Program audits.

In accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. 4321 *et seq.*, DOE prepared a Draft Environmental Impact Statement (DEIS) for the RCS Program. This DEIS, DOE/EIS–0050D, was made available for comment by a notice in the **Federal Register** on July 16, 1979 (44 FR 41208). As mentioned above, a hearing on this DEIS was held on August 14, 1979. Comments received both at this hearing and during the 45 day public review period were reviewed by DOE and appropriate responses included in the Final Environmental Impact Statement (FEIS). The FEIS is published in conjunction with this Final Rule and is summarized in Section XII of this Preamble. Certain portions of the DEIS pertaining to indoor air quality were substantially modified in the FEIS in response to both comments received on the DEIS and the Proposed Rule and to additional DOE concerns on this subject. By separate notice, DOE will propose an amendment to the RCS Program which will address the general subject area of indoor air quality.

The Final Rule is not the end of this process. Rather it is only the framework for the real action to begin, and not until every customer is encouraged to get an energy audit, gets one and acts on its information by making his home more energy efficient will the real end be reached. This end will not be reached without the States, utilities, home heating suppliers and DOE all working toward achieving it.

The principal authors of this Final Rule are: Shelley Launey, Jackie Goff, Susan Caplan, Ken Schafer, Dan Quigley, Gary Moore, William Funk, Mary Ann Bernald, James Tanck, and Ernie Freeman.

Despite our best efforts in the Rule and Preamble to clarify provisions where questions of interpretation were raised, undoubtedly some persons affected by the Rule will have questions concerning the meaning of particular provisions. Format interpretations concerning the Rule may be obtained pursuant to the procedures found in 10 CFR 205.80 *et seq.* Informal interpretations may be obtained by contacting the Office of the Assistant General Counsel for Conservation and Solar Energy, 20 Massachusetts Avenue, N.W., Washington, D.C. 20585, (202) 376–4011. General information about the RCS Program can be obtained from the Director of the RCS Program. Formal petitions for amendments to this Rule may be filed by submitting one copy to the Assistant Secretary of Conservation and Solar Energy and one copy to the General Counsel of the Department of Energy.

Given the length and complexity of the Final Rule, DOE has arranged a question and answer session for interested persons and representatives of interested organizations following publication of the Final Rule. The session will be held from 9:30 a.m. to noon Monday, November 19 at the Quality Inn, 415 New Jersey Avenue, N.W., Washington, D.C. The session will be tape recorded and the recording will be available in the DOE Reading Room, Room GA–152, Forrestal Building, 1000 Independence Avenue, S.W., Washington, D.C. between the hours of 8:00 a.m. and 4:30 p.m., Monday through Friday.

## II. Subpart A—General Provisions and Definitions

### *A. General Provisions*

Section 456.102 of the Proposed Rule provided the procedure by which a utility files a petition to the Assistant Secretary when it becomes aware of a conflict between NECPA and any State or local law or regulation. The Section also provided for the Assistant Secretary to give notice of the petition and opportunity for comment to the Governor, State Energy Office, the State Regulatory Authority and other parties the Assistant Secretary deems appropriate.

DOE received 14 comments regarding petitions concerning conflicts of laws.

At least three commenters suggested that the responsibility for filing petitions concerning conflicts of laws should rest with the State rather than the utility. The example of a State law covering all the utilities in the State was offered as a situation in which State research of laws and filing of a general petition would eliminate the duplication of effort required if all affected utilities had to file separately.

NECPA limits DOE's flexibility to assign to the State the responsibility for filing petitions. Section 220 of NECPA assigns this responsibility to the utility. As the agents of the RCS program, utilities are most likely to be aware of and affected by conflicts between NECPA and State and local laws and regulations. However, utilities may submit class petitions to avoid duplicative filing.

The Denver Office of Energy Conservation commented that the rules do not specify a time frame within which petitions must be made.

Section 456.303 of this Rule specifies that the State Plan shall require each covered utility to petition the Assistant Secretary whenever the utility believes a conflict between laws exists. DOE does not believe that any particular time limit need be set by DOE. It is incumbent on the State to ensure enforcement of the State Plan.

Six commenters recommended that the Assistant Secretary give notice and opportunity to comment to all utilities affected by a conflicting law or regulation cited in a petition submitted to the Assistant Secretary. It was further suggested that the Assistant Secretary give notice of petitions in the **Federal Register.**

The Final Rule, as well as the Proposed Rule, provides that the Assistant Secretary will notify the Governor, the State Energy Office and the State Regulatory Authority of the affected State. These entities may notify other interested utilities. Moreover, the Rule provides that the Assistant Secretary may notify other interested parties. It is believed that all affected utilities will have notice and an opportunity to comment under these procedures.

Several commenters proposed that the Secretary give notice and opportunity to comment to the utility that filed the petition, in addition to the parties specified in the Proposed Rule.

DOE does not feel that such a provision is necessary, since the petition contains the utility's comment.

One commenter suggested that the Assistant Secretary specify the criteria that will be used in deciding whether a State or local law will be superseded by NECPA or a rule or plan promulgated pursuant to NECPA.

The determination that the Assistant Secretary will make is whether there is an irreconcilable conflict between a State or local law or regulation and NECPA or the rules and plans promulgated pursuant to NECPA. This is the only criterion upon which a decision will be made.

Two comments questioned DOE's authority to supersede State and local law. This authority is provided in Section 220 of NECPA. Another commenter questioned DOE's authority to broaden NECPA's provision concerning conflict of laws to include conflict with rules or plans promulgated pursuant to NECPA. Such authority is necessary and appropriate under DOE's rulemaking authority to ensure adequate implementation of NECPA.

There was one suggestion that the enforcement of regulations affecting a utility be suspended in whole or in part until the petition and appeal processes are completed. DOE expects that all conflicts will be identified early in the planning process, so that the utility will not encounter any difficulties with enforcement. If a case were to arise where a utility after implementing its program found a conflict with a State or local law or regulation, it would be bound by the State or local law or regulation until the Assistant Secretary determined that the statutorily required conflict exists, at which point the State or local law or regulation would be superseded.

*B. Definitions—§ 456.105*

Most of the 255 comments addressing Section 456.105 of the Proposed Rule were from utilities commenting on: 1) additional energy conservation measures; 2) furnace efficiency modifications (including fuel switching and heat pump utilization); 3) energy usage display meters; 4) closing vents, valves and doors in infrequently used rooms; and 5) clock thermostats and night temperature setback.

Definitions that are not discussed have not been changed or were not subject to major comment.

*Furnace Efficiency Modifications:* The definition of "furnace efficiency modifications" elicited 159 responses. Comments concerning fuel switching and heat pumps were categorized in this section. A diversity of opinions was expressed. The majority of commenters argued that in the interest of "improving combustion efficiencies of existing equipment" the Final Rule should not prohibit fuel switching. Many respondents, mostly electric utilities, suggested that heat pumps should be classified as replacement furnaces for *all* heating systems. However, several, mostly gas utilities, recommended that heat pumps be allowed to replace electric resistance space heating only.

The term "replacement furnace" has not been changed in the Final Rule. Only replacements of furnaces with the same fuel are required to be analyzed by the auditor. This would include heat pump (including water source heat pump) replacement of electric resistance heating. However, as discussed in Section IV S of this Preamble, a State may request inclusion of fuel conversion measures as State measures according to Section 456.319. DOE has not included fuel conversions as a national energy conservation measure in the Final Rule for the following reasons. Whether such conversions save oil or gas depends greatly on climate and other factors which vary substantially around the country. In particular, conversions from oil or gas to heat pumps may actually increase oil and/or gas consumption in some regions. To be consistent with NECPA's policy, DOE would have to analyze these various factors on a State-by-State or utility-by-utility basis. Under the circumstances, DOE believes it is more appropriate that these replacements be considered by States according to their own needs and circumstances.

*Energy Usage Display Meters:* The exclusion of energy usage display meters as an energy conservation measure was suggested by several commenters. It was pointed out by one State agency that "the irritation of continually resetting it due to rate adjustments, will lead * * * to consumer abandonment of the device." Other respondents mentioned that the device has "no inherent ability, either thermally or mechanically" to reduce energy consumption. Limited commercial availability was another reason cited for proposing its removal. Two companies that manufacture these devices favored its inclusion and provided information concerning their products.

The "energy usage display meter" has been deleted from the Program for the time being, because sufficient data is not available to accurately predict their energy savings. Therefore, it is not possible to estimate savings of these devices in an audit. DOE is conducting a demonstration program for these devices and intends to include these devices in the Program if the completed demonstration generates sufficient data upon which to quantify energy savings.

*Clock Thermostats and Night Temperature Setback:* Many commenters suggested that the term "setting back thermostats * * * during sleeping hours" should be simplified to "night temperature setback," either manually or by automatic control device (clock thermostats). This includes lowering temperatures during the winter and raising them during the summer at night. Other commenters felt that this practice and measure should not be included in the Final Rule. The primary reasons given were that night temperature setback might increase KWH consumption and add to early morning peak load conditions, particularly in houses with heat pumps or other forms of electric space heating.

Clock thermostats have been retained as energy conservation measures. A number of studies have shown that the reduction of nighttime temperatures in winter is an effective way to save energy and money, regardless of the fuel source. For homes heated with electric resistance systems, nighttime temperature reductions could create load peaking problems, though no evidence was presented that such peaks currently exist. Under most current electric rate schedules, residential customers will save both kilowatt-hours and money through night setback. In the special case of heat pumps, as addressed below in Section X of this Preamble, DOE has found that customers who set temperatures back at night do save money and kilowatt-hours, though not to the same degree as those with other heating systems.

*Energy Conserving Practices:* Commenters felt that the energy conserving practice of closing vents, valves and doors in infrequently used rooms should be deleted from the list of practices. The rationale for this

suggestion included comments that such a practice would "create an imbalance in the central system" leading to inefficiencies and equipment malfunction; with central air conditioning systems, such a practice could cause icing, refrigeration cycle damage, increased fan energy consumption and burning out of the motor; and with electric heating systems, such a practice could cause the coil to operate at higher temperatures and possibly burn out, and increase fan energy consumption. "Closing vents, valves, and doors in infrequently used rooms" has been deleted as a practice because this action might adversely affect furnace or air conditioner efficiency or safety.

The deletion of the $20 limit in the definition of energy conserving practices was suggested because this limit will become unnecessarily restrictive over the life of the Program if price inflation continues at current rates.

The $20 limitation on the cost of practices has been deleted because DOE believes that many important actions which cost more than $20 and which ought to be brought to the customer's attention are inappropriate for the list of measures. One or two practices the cost of which exceeds $20 have been added by DOE. The Governor may include other practices, subject to approval by the Assistant Secretary in the State Plan.

Each of the practices must be addressed in the Program Announcement and the audit.

*Additional Energy Conservation Measures and Practices:* Many additional energy conservation measures were suggested, not all of which met the seven criteria listed in the Preamble to the Proposed Rule. High energy efficiency appliances, both gas and electric, topped the list. The next most frequently mentioned additional measure was the use of wood as a source of fuel. In conjunction with wood-burning stoves and furnaces, increased use of fireplaces as heating sources was also suggested. Modifications to increase fireplace efficiency were suggested: glass doors, heat exchangers and caulking around flue openings and chimneys.

The following is a list of additional energy conservation and renewable resource measures which commenters mentioned: waste heat recovery devices for space heating, air conditioning and hot water systems; water heater heat exchangers, heat pump water heaters, active and passive solar water heaters, woodburning water heaters and an expanded definition of water heater insulation to include insulation kits and board and loose fill insulation; various window treatments and shading, including thermal shutters, insulating curtains, drapes and shades, sunscreens, awnings, plastic shields, and shade trees and shrubs; increased insulation of hot water pipes; maintenance of heating and cooling equipment, including annual cleaning and tuning; replacement of gaskets on refrigerators and freezers and service policies for equipment; attic or whole house fans; appliance venting modifications; filter monitors; dehumidifiers; mercury or fluorescent lighting and light dimmers; plastic, solar or thermal swimming pool covers; and conventional electric heat pumps as well as water source heat pumps.

Few comments were received detailing State-specific additional measures. However, several respondents indicated that more flexibility should be granted to the States to allow them to more easily incorporate additional measures or practices into the State Plan.

One measure has been added to the list of energy conservation measures: replacement central air conditioners. This measure was found to meet the criteria for adding measures to the national Program. DOE has not found any evidence that existing manufacturing and installation practices for this product are inadequate to ensure safety and effectiveness.

The principal reasons that no other measures were added to the national Program are that the suggested additions would not save a substantial amount of energy on a national basis and that DOE has allowed States the flexibility to add those measures which they believe important and which meet DOE criteria (see discussion below). Three measures, however, deserve particular mention. Devices for heating water with the waste heat of air conditioners seems to be very effective in certain parts of the country with high air conditioning loads. DOE could not readily determine in which geographic locations this is true, though it appears that the locations are few. DOE encourages States with unusually high cooling needs to propose these devices as State measures in their State Plans.

The second measure deserving particular mention is the wood stove. The President has recommended incentives for the purchase of wood stoves, and DOE intends eventually to add them to the national RCS Program. However, the national and regional environmental effects of the use of wood stoves have never been examined in detail. Rather than delay implementation of the RCS Program while an Environmental Impact Statement (EIS) is prepared for wood stoves, DOE has left these devices out of the Program until an adequate EIS is completed, at which point DOE will consider adding them.

The third measure deserving particular mention is the whole house fan. This device appears to be a cost-effective substitute for a central air conditioner. DOE has not found any problems with the safety or effectiveness of existing manufacturing and installation practices for whole house fans. However, DOE has not found an adequate procedure for estimating the savings of the whole house fan in a particular house. DOE therefore has been unable to determine whether these devices should be Program measures or to develop auditing calculation procedures for them. DOE will continue to work on these problems, and encourages States to propose the whole house fan as a State measure in their State Plans.

Most of the other suggestions for additional measures have been rejected for one or more of the following reasons: (1) safety or effectiveness standards are necessary but unavailable, as with furnace waste heat devices; (2) the application of the device in homes is limited or would produce very low savings nationwide, as with replacement refrigerator gaskets; (3) estimation of savings would be difficult for an auditor, as with shade trees or filter monitors; and (4) the principal purpose is not energy conservation or the use of renewable resources, as with dehumidifiers.

A few items have been incorporated into the list of practices rather than the list of measures because they are low-cost, can be installed by the homeowner, or are likely to last less than three years. These include curtains, drapes, shades and furnace and air conditioner maintenance. Awnings and sunscreens have been included as solar cooling devices. For two items, replacement fluorescent lighting fixtures and attic fans, adequate data as to their effectiveness was not presented. DOE is continuing its evaluation of passive solar water heating. Water source heat pumps are included in the same way other heat pumps are included, that is, as replacement furnaces in certain homes.

*State Measures:* One of the most frequent comments on the Program was that States did not have adequate flexibility to add measures to the Program which they believe to be particularly important. DOE has decided to add this flexibility to the Program to encourage Programs tailored to the particular needs of each State. As

mentioned above, we have found that many measures are beneficial only in particular States. Rather than make a State-by-State determination of the viability of dozens of measures, DOE has left these measures to State discretion. DOE encourages States to consider adding additional measures to their Programs subject to the criteria in Section 456.319 of this Final Rule. These criteria are discussed in detail in Section IV S of this Preamble.

*Renewable Resource Measures:* Comments concerning renewable resource measures included recommendations for additional measures, as well as requests for removal or redefinition of those measures identified in the Proposed Rule. A Large percentage of the comments questioned the market readiness of specific renewable resource measures. Comments regarding the method DOE used in establishing the applicability of measures for specific geographic zones will be addressed in Section IV E of this Preamble.

DOE has retained in the Final Rule each of the renewable resource measures listed in the Proposed Rule with the exception of roof ponds. DOE analysis indicates that all of the remaining measures are cost-effective and viable in at least some parts of the country. Standards for these measures have been incorporated in this Rule or are being proposed for comment. In addition, Congress clearly intended to incorporate renewable resource measures as an integral part of the RCS Program.

*Passive Solar Measures:* DOE received only a limited number of comments specifically addressing definitions of those passive solar measures identified in the Proposed Rule. Two commenters recommended broadening the proposed definition of Passive Solar Space Heating and Cooling Systems.

The State of Georgia recommended that the proposed definition was too limited inasmuch as some "passive" solar systems utilize mechanically forced energy transfer. The commenter further recommended that DOE adopt the definition of this measure as given in the *First Draft Model Document for Code Officials on Solar Heating and Cooling of Buildings.* Similarly, the National Bureau of Standards (NBS) recommended that DOE revise the proposed definition by removing the specific four subcategories of passive measures, thereby considerably expanding the scope of the definition for the purposes of the RCS Program.

DOE recognizes that the definition of this measure as given in the Proposed Rule was narrowly drawn. DOE recognizes that the proposed definition is more limiting than that given in the Model Document. DOE notes that the Model Document is undergoing a series of revisions, and the definition of this measure in the second draft has been substantially modified. DOE considers it unnecessary to broaden this term since, in the Final Rule, States may add measures which are applicable to their jurisdictions.

DOE agrees with the comment that "passive" measures may use mechanical means of heat transfer. As discussed in the Preamble to the Proposed Rule, DOE does not intend to exclude such systems.

Roof ponds were identified in the Proposed Rule as passive solar space heating and cooling systems. DOE has decided to drop roof ponds from the list of passive measures in the Final Rule. This is not meant to imply that such techniques are not cost-effective, but only that DOE believes that they are inappropriate for the Program. These systems do not satisfy Program criteria since the techniques are restricted to particular climates in the southern latitudes and are not generally applicable to residences with pitched roofs. Moreover, their inclusion is inconsistent with DOE's decision to simplify the audit and reduce the required qualifications for the auditor. A satisfactory audit for these systems would require an extensive assessment of roof structural capacity, complicate the auditing process, and thus unduly increase audit costs.

A great number of commenters suggested the addition of various methods of reducing heat gain through windows. These suggestions included techniques such as solar screens or window awnings, window shades, roof overhangs, etc. Numerous other commenters suggested additional devices such as insulating shades or reflective window films.

In response to these many positive and constructive comments, DOE has added "Window Heat Gain Retardants" to the definition of passive solar measures. In defining this measure, DOE has attempted to incorporate as many of the recommendations as possible but does not include every device potentially applicable to this type of passive solar.

With respect to those recommendations not included within this expanded definition, DOE either (a) has not been able to establish the national applicability of the recommendations or (b) has concern as to the need for standards to ensure adequate performance over the anticipated lifetime of the product. DOE wishes to note, however, that under the provisions regarding designation of State measures, interested States may wish to recommend addition of devices as separate State measures.

For those devices included within the definition of Window Heat Gain Retardants, DOE is now convinced that incorporation will result in substantial energy savings; that the Model Audit under development by DOE will be capable of computing reasonable estimates of costs and savings; and (commensurate with the decision regarding standards for passive solar devices) that specific RCS standards are not required.

*Additional Renewable Resource Measures:* Numerous commenters suggested that additional renewable resource measures be added to the Program. The most frequent suggestion was for the addition of wood burning stoves for space heating and hot water. Representatives of the States of Arkansas, Michigan, and Vermont, as well as the Missouri Public Service Commission, favored the addition of wood burning stoves. They were joined by several advocates for low income homeowners who pointed out the apparent economics of this renewable energy source. Wood stoves are addressed above under "Additional Energy Conservation Measures."

DOE received a number of comments recommending that solar assisted heat pumps be incorporated into the Program as a renewable resource measure. Although DOE is funding further development of these devices, DOE cannot currently conclude that solar assisted heat pumps meet the criteria established for designation of Program measures. Further, DOE does not have a model audit which provides reasonable estimates of the costs and savings associated with solar assisted heat pumps under the diverse climatic and load conditions existing throughout the country. Finally, DOE has not been able to complete its deliberations with respect to whether standards are necessary for installation and efficient operation of these systems. Therefore, DOE does not, at this point, include these items in the RCS Program. DOE will continue its research into these matters and may reconsider this decision at some future time. In the interim, DOE encourages the States to consider the merits of solar assisted heat pumps as potential State measures under the market and environmental conditions present in their jurisdictions.

Several commenters suggested the addition of pool covers as a measure; one proposed the technique of painting the bottom of the pool with black paint.

DOE acknowledges that these techniques could provide substantial savings in fuel costs to the consumer. However, technical questions have been raised concerning performance degradation due to self-adherence of panels and panels becoming coated with algae, thereby losing transmissivity. Other questions have been raised concerning flammability of the polyethylene materials used for some covers when stored in rolls. DOE was unable to identify any proposed or final safety standards for pool covers to assure avoidance of these potential problems. DOE is also examining methods to audit for these techniques that substantially account for heat gain through the cover, the influences of reduced evaporative losses, and the broad variety of materials and material characteristics (such as thicknesses and opacity) which are applicable to these devices.

Although DOE is not currently able to establish pool covers as a national measure, DOE encourages interested States to consider the addition of pool covers, and allied techniques, to their State Plans as State measures for those residences having swimming pools currently heated by nonrenewable resources.

Several commenters suggested the addition of low-head (residential) hydro power systems to the Program. This technology is generally applicable in rural areas not serviced by the larger utility companies that are required to implement the RCS Program. DOE is funding the continued development and demonstration of this technology. This research addresses the legal and environmental issues relating to access to streams and the potential for environmental damage. These issues are difficult to consider during the course of an audit. DOE may consider adding this technology to the RCS Program at a later date.

*Program Warranty:* The definition of Program warranty was felt to be incomplete. Commenters suggested that it be stated explicitly that "warranty" meant the manufacture's warranty, or sometimes, the contractor's warranty—not a warranty from the utility company—in order to lessen utility liability. The three year provision was felt to be too long a period of time. It was suggested that the time period be limited to one year. Possible conflicts with the Magnuson-Moss Warranty Act were cited.

The term "Program warrranty" has been changed to "measures warranty", and has be changed to clarify that it is a manufacture's or contractor's warranty, not that of a utility or the State. For those measures or types of measures which are composed of a variety of products which are not sold as a system by a manufacturer and which are assembled by a retailer or an installer, the retailer or installer is considered the manufacturer, as was described in the Proposed Rule.

In adding a contractor's warranty to the definition of "measures warranty," DOE does not intend to create any burden or involuntary requirement on contractors. To the contrary, this addition is solely to aid contractors who wish, for whatever reason, to utilize a type of measure which the manufacture will not warrant for three years. Under this circumstance, the contractor can still install the type of measures under the RCS Program , if he is willing to warrant it himself for the three year period. In addition, if a manufacturer warrants a measure for one year, the contractor could warrant it for an additional two years.

Nothing in this definition requires a contractor to further warrant a program measure which a manufacturer has warranted for three years.

The term of the measures warranty remains at three years DOE recognizes that this may increase some products costs, particularly for those systems assembled by a retailer or installer as described above. However, NECPA clearly indicates that the manufactuer's warranty must be for a useful life of three years.

DOE has examined the possibility of conflicts with the Magnuson-Moss Warranty Act and believes that there are none.

*Eligible Customer:* Variations for the definition of eligible customer were suggested in the comments. It was suggested that an eligible customer be defined as simply an occupant of a metered residence, thereby including tenant- and multi-family occupied dwellings. Others wanted a distinction drawn between tenant- and owner-occupied residences. Utility companies felt that it would be extremely difficult to distinguish between the two. Some commenters suggested that renters should have the landlord's approval before applying for an audit or even receiving a Program Announcement. One commenter suggested an "eligible customer" be defined as a "customer with a 12-month billing history." Another question whether customers who had not paid their bills would still be considered eligible.

The term "eligible customer" has been modified to clarify that it includes owners or tenants who directly receive the bill from the utility or home heating supplier for fuel. The term includes landlords who receive the fuel bill from a utility or home heating supplier and excludes tenants who do not directly receive the fuel bill.

*Energy Audit:* In the definition of "energy audit" in the Proposed Rule, deletion of the phrase "on-site inspection" was requested. This would allow Class B audits, which many respondents favored, to be offered by the program.

Two new terms, "Program audit" and "Class B energy audit" have been substituted for the term "energy audit." The Program audit is an energy audit in which the estimates of cost and savings are based on an inspection of the residence of an eligible customer by an auditor qualified according to a State Plan. A Class B energy audit is a procedure for providing estimates of the costs and savings of energy conservation and renewable resource measures which are based on information provided by the customer, generally through the mail. This term is not the same in all respects as the definition of "Class B information audits" in the supplemental State grant program established by the Energy Conservation and Production Act (Pub. L. 94–385). Both terms assume that the cost-savings estimates are based on measurements taken by the customer and sent to the auditing organization. However, the supplemental State grant program has further requirements for Class B audits which do not apply in the RCS Program. We have use the term only because it has developed a common usage with which most utilities and States are familiar.

The creation of a new term "Program audit" in no way reduces the requirements for the offer of on-site inspections as part of the RCS Program, but merely allows a utility or home heating supplier to also offer a Class B audit to eligible customers in conjunction with the RCS Program. The prohibition against preconditioning an on-site audit on any other audit is retained in the Final Rule.

*Floor and Perimeter Insulation:* Several commenters suggested that floor and perimeter insulation should be defined separately since different insulation materials and installation techniques were called for.

DOE has not separated these items in the definitions, since, in general, the applications of these materials are similar but typically only one of these items is applicable in a given residence.

*Covered Utility:* Clarification of "covered utility" was sought. The definition in the Proposed Rule provided that sales of natural gas or electricity by a utility to industrial customers are to be

included in the sales total, and it was suggested that residential sales rather than total sales should be the factor determining whether a utility is included in the RCS.

The definition of "covered utility" is the same as that in the Proposed Rule. Although this definition includes some utilities with rather small residential sales, it is the same as that in NECPA. DOE does not have authority to change this definition. Utilities with total sales less than 750 million kilowatt-hours or 10 billion cubic feet of gas are not covered by NECPA or by our Rule. A State may choose to include such utilities in a State Plan if the State has authority to do so, but they would not be subject to DOE review or enforcement.

*C. Utility Liability—§ 456.106*

In response to numerous requests from utilities that their liability under the RCS Program be limited, DOE has added Section 456.106, Utility Liability, which incorporates the language in the Conference Report regarding utility liability. In including this language, it is not DOE's intent to override contrary State law. Rather it is to make clear and restate Congress's intent that utilities, solely by reason of their project manager role, should not be considered responsible for the actions of suppliers, installers, or lenders with whom the utility arranged Program services. Moreover, by including this statement with regard to utility liability, DOE does not mean to suggest that utilities or others involved in the RCS Program should be held liable in other circumstances. DOE has included home heating suppliers in this liability statement because of their equivalent role as project manager.

**III. Subpart B—Procedural Requirements for State Plans**

Section 456.202 of the Proposed Rule required that, if the State intends to submit a State Plan, then the Governor or State agency specifically authorized by State law to submit a State Plan must inform the Secretary within 30 days of promulgation of the Final Rules of the name and address of the State agency which will have principal responsibility for the development of the State Plan.

Thirty-seven comments were received regarding the initial submission procedures detailed in Section 456.202. The Iowa State Commerce Commission recommended that the Governor have the option to designate two lead agencies with separate functions. The National Association of Regulatory Utility Commissioners requested that any technical assistance material provided to a State lead agency be provided to the regulatory authority as well, where the regulatory authority is not the lead agency.

DOE feels that the designation of a single lead agency in a State allows a more unified State Plan and more effective dispersal of technical assistance to the agencies that are responsible for developing the State Plan and has retained the term "lead agency" in the Final Rule. DOE recognizes the valuable input that would be derived by effective coordination between the lead agency and the State regulatory authority where the regulatory authority is not the lead agency. This is more fully discussed below.

Section 456.202(b) of the Proposed Rule reflected DOE's interpretation that, if the Governor includes any nonregulated utilities in the State Plan, then the Governor must include all of them.

At least 14 nonregulated utilities and State agency representatives expressed concern over this interpretation. Commenters saw this provision as limiting the flexibility of the Governor to design an effective plan and respond to State-specific circumstances. Several nonregulated utilities requested that the Rule provide that nonregulated utility participation be at the option of the utility. One nonregulated utility testified that the Proposed Rule as written would require inclusion of non-covered nonregulated utilities in the State Plan along with covered utilities. Three commenters requested that the Governor's option to include nonregulated utilities be removed altogether. The State of Oregon Department of Energy requested that the Rule require Governors to include in their State Plans those nonregulated utilities desiring inclusion in the Plan.

NECPA provides that the State Plan may, at the discretion of the Governor, apply to nonregulated utilities in the State. In light of the comments received from both nonregulated utilities and State agencies, DOE has reconsidered its interpretation of this provision of NECPA. The Rule has been altered to allow the Governor to include selected nonregulated utilities in the State Plan. Inasmuch as NECPA explicitly grants the Governor the discretion whether or not to include nonregulated utilities, DOE does not believe it would be appropriate to place conditions on this discretion. DOE hopes, however, that Governors will consider the wishes of the nonregulated utilities. DOE admits that the Proposed Rule as written could be interpreted to require that non-covered nonregulated utilities be included in the State Plan. This was not the intent and the Final Rule has been clarified.

Two commenters, pointing to a large conservation potential in oil-heated residences, requested that home heating suppliers' participation in the State Plan be required or encouraged. On the other hand, one commenter stated that it was inappropriate for the regulations to suggest that the Governor may require home heating suppliers to participate. In addition, one commenter recommended that no time limits be placed on the Governor to indicate whether home heating suppliers would be included in the State Plan.

DOE strongly encourages home heating supplier participation in the RCS program, particularly in those States where a large number of residences are heated by oil. However, NECPA reserves the decision on inclusion of home heating suppliers in the Plan to the Governors. Moreover, the home heating suppliers are not required to participate, but do so on a voluntary basis. For effective planning purposes, the time requirement relating to inclusion of home heating suppliers in the State Plan has been retained. However, because a State Plan may always be amended by a State pursuant to the procedures in this Subpart, an initial decision not to include home heating suppliers could later be changed.

Section 456.203 of the Proposed Rule contained two requirements for coordination in the development of the State Plan. Subsection (a) required the lead agency to coordinate the Plan with neighboring States that have jurisdiction over any covered utility or participating home heating supplier subject to the Plan. Subsection (b) required the lead agency, if such agency was not the State regulatory authority, to provide a copy of the Plan to the regulatory authority 30 days prior to the public hearing required by Section 456.204.

There was testimony that coordination among States would be burdensome for the State; there was more testimony that the requirement was insufficient. For example, three witnesses requested that there be provision for DOE to intercede where a utility is covered by more than one State Plan requiring different utility programs. One commenter requested that the Rule require each State Plan to describe how its Plan will interface with Plans of adjoining States and to describe what steps have been taken to assure that there will be no conflict between the lead agency and the regulatory authority.

Several regulatory commissions suggested that the Rule require mandatory coordination with the

regulatory authority where the regulatory authority is not the lead agency. The National Association of Regulatory Utility Commissioners suggested that the Rule require that the lead agency secure the approval of the regulatory authority before submitting a State plan. Four utilities requested that the Rule require the lead agency and regulatory authority to agree on general policy prior to Plan submittal.

In every State, regardless of who is the lead agency, the State regulatory authority will have a significant role to play in the implementation of utility programs. The purpose of § 456.203 of the Proposed Rule was to underscore DOE's interest in cooperation among States and between State agencies in Plan development. This requirement remains intact in the Final Rule. The means by which a State effects coordination and resolves differences between State agencies is appropriately left to the State and should not be imposed by DOE.

In addition, at least two utilities requested that the lead agency be required to submit copies of the State Plan to utilities as well as the regulatory authority prior to the public hearings on the Plan. There was one suggestion for mandatory coordination with utilities. Four commenters suggested allowing or requiring comments of utilities to be submitted in conjunction with the State Plan.

The utility, being the primary instrument of the RCS Program, should be involved in Plan development. The level of this involvement is most appropriately determined on a State-by-State basis. The Rule does require that the Plan be available for all interested persons 30 days before the hearing. Also, the Rule as written does not prohibit any entity from submitting comments on a State Plan. It does not seem necessary that comments on the State Plan be a requirement.

Section 456.204 of the Proposed Rule detailed minimum requirements for the lead agency in providing notice, comment, and public hearing on the State Plan prior to its submittal.

One commenter described the requirements for notice, comment, and public hearing as too prescriptive. Another commenter suggested that the notice requirement be expanded. Several commenters suggested that there be public hearings at different locations throughout the State, to increase the public participation in the planning process. There was suggestion that the notice time be extended, and that there be notice in the media in languages appropriate to a locality. Several commenters requested clarification as to the hearing requirements for revised or modified Plans. It was specifically recommended that there not be a hearing requirement for minor Plan modifications. One commenter sought clarification as to whether the hearing was an evidentiary hearing.

DOE expects that the lead agency will consult with utilities, home heating suppliers, contractors, and consumers early in the planning process. NECPA allows only six months for the States to submit their Plans, and DOE has decided not to prescribe the number of hearings or the groups to be consulted in any more detail than in the Proposed Rule. States, of course, have the flexibility to expand the notice and comment activity and respond to circumstances at the local level. DOE agrees that hearings on minor Plan modifications made after initial disapproval of a State Plan are not necessary. DOE will decide, based upon the type and extent of the Plan changes, whether hearings are necessary and will so instruct the States. NECPA, however, requires public hearings and comments on all changes to an approved State Plan. The hearings required are public hearings held for the purposes of receiving public comment. They are not evidentiary hearings.

Section 456.205 of the Proposed Rule detailed procedures for submission and approval of State Plans. Included in these procedures was a requirement that State submit Plans within 180 days of promulgation of the Final Rule.

Numerous commenters testified that 180 days are insufficient for Plan development and submission, especially considering coordination difficulties that may be encountered. The requirement for submittal within 180 days is contained in NECPA. However, by making the effective date of the Final Rule approximately one month after publication, DOE has attempted to provide additional time for States to develop Plans.

Section 456.207 of the Proposed Rule contained a few provisions necessary to clarify the role of the TVA in the RCS Program.

Several utilities in the TVA service area commented about duplication of effort involved in the preparation of State and TVA Plans and utility programs that implement those Plans.

Some requested that utilities subject to the TVA Plan, should TVA choose to submit a Plan, be covered only by that Plan. NECPA provides that utilities subject to the ratemaking authority of TVA are subject to TVA's plan, not a State Plan. With respect to utilities some of whose rates are subject to TVA and some of whose rates are subject to a State regulatory authority, we have provided that in TVA's discretion these utilities may be included only in TVA's plan.

Section 456.208 of the Proposed Rule contained requirements for submission and approval of temporary program requests, requests which if granted would exempt one or more utilities from some of the requirements of the provisions of Subpart C of the Rule. Included in these requirements was provision for submittal of a request within 180 days of promulgation of the Final Rule. The Proposed Rule stated that the Secretary may approve such a request for a period of time not to exceed three years. There was also provision of the Secretary to approve or disapprove such a request within 90 days.

Several comments pertaining to temporary programs where received. A number of commenters requested that DOE liberally approve temporary programs to allow on-going programs to continue and to allow utilities and States more time to bring their programs in compliance with all the requirements of the Rule. Some objected to the three-year limitation on temporary programs. One commenter pointed out that the 180 day requirement for a temporary program request precluded the opportunity to request a temporary program approval in the event that a State Plan is not approved. There were also requests to allow equivalent programs as a permanent substitute for the program outlined in the Rule.

Approval of temporary programs and the time that they may be in force will be considered on a case-by-case basis. The three year limitation is contained in NECPA as is the 180 day submission requirement for temporary program requests and therefore cannot be changed in the Rule.

The intent of Congress was clear in its requirement that existing programs ultimately be changed to comply with the RCS Program.

DOE wishes to point out that requests for temporary programs can be made for specific elements of a State or nonregulated utility Plan (e.g., listing) or for entire programs. Requests may also be made with respect to a particular utility under the State Plan or for all utilities.

Nonregulated utilities objected to needing the approval of the Governor to propose a temporary program. Nonregulated utilities not included in a State Plan need not secure the approval of the Governor to propose a temporary program. Nonregulated utilities included in a State Plan must secure that

approval. This is required by NECPA. There was one request that the Secretary approve or disapprove a program within 30 days, in contrast with the 90 day provision of the Rule. NECPA provides for approval or disapproval within 90 days, and this provision remains intact in the Final Rule.

## IV. Subpart C—Content of State Plans

*A. Additional Requirements by States and Existing Conservation Programs—§ 456.301*

There were a few comments concerning States adding requirements to the requirements of this Rule. The South Carolina Office of Energy Resources submitted that the provision for States to add further requirements is too vague and general. Carolina Power and Light recommended removing the State's option to impose additional requirements, citing the potential for increasing the cost of the Program.

Several persons commented that ongoing programs should serve as the nucleus for the RCS Program or that such programs should substitute for the RCS Program.

Since the RCS Program is a State-administered program, DOE feels that the State must have the authority to add requirements it feels are necessary to respond to State-specific circumstances and to achieve State goals for energy conservation. DOE intends that this provision be interpreted broadly to provide the maximum opportunity for a State to fashion its own program.

NECPA does not exempt existing programs from compliance with its provisions. Existing programs (unless they are approved as temporary programs [see § 456.208]) may have to be changed to bring them into compliance with NECPA and these Rules. DOE recognizes the many and varied accomplishments that the utilities and States have made in their programs, and hopes that the valuable experience that has been gained will be put to use in the RCS Plans and Programs.

*B. Investigation and Enforcement—§ 456.303*

Several State agencies commented that they may not have adequate authority to enforce State Plan provisions, and cannot specify when legislation providing such authority will be passed. Problems with authority fragmented among several agencies were also raised. The Denver Office of Energy Conservation requested that States have the flexibility to use existing enforcement mechanisms or to contract for investigation. Three commenters requested that States have the flexibility to achieve voluntary compliance by utilities with the State Plan. The State of North Carolina commented that DOE should extend to the State its authority to invoke civil penalties.

Responsibility for enforcing a State Plan rests with the State. Section 213 (a)(1) of NECPA provides that no State Plan shall be approved by the Secretary unless it contains "adequate State enforcement procedures." The Conference Report emphasized that enforcement of the State Plan is a State responsibility and that State Plans should contain adequate enforcement procedures before being approved by the Secretary.

The Final Rule provides flexibility for the State in designing a means of enforcing the State Plan. However, the State must show that its proposed enforcement procedures are adequate and fully capable of implementation. For example, if the State decides to delegate enforcement responsibility over some or all utilities to a local municipality or a State Regulatory Authority, it must state its reasons for delegating the responsibility, the legal authority of the municipality or Authority for carrying out enforcement of the State Plan, the resources which will be made available by the municipality or Authority, what the State considers to be adequate enforcement, and what oversight the State will exercise with respect to the actions of its delegate.

The State must explain whether the State Plan will be legally enforceable through existing State law or what legislation the State proposes to make the State Plan enforceable, and when passage of such legislation is anticipated, or what alternative form of enforcement, including voluntary compliance, it intends to utilize. The State must also describe the interrelationship among existing and proposed State and local laws which may affect the enforcement of the State Plan and explain how these laws will be enforced so as to be consistent with the enforcement of the State Plan. NECPA provides DOE the authority to invoke Federal Standby and implement a Federal RCS Program in States where a State Plan is being inadequately implemented. DOE cannot delegate this authority.

However, DOE recognizes that some States may have difficulty in stating when legislation providing appropriate authority will be passed. In such cases, voluntary compliance may suffice while legislation is being sought. In such circumstances, DOE would expect the State to obtain adequate assurance of voluntary compliance with the State Plan, to exercise close oversight to ensure compliance, and to report quickly noncompliance to DOE.

Nonregulated utilities objected strongly to the establishment of any State authority over the nonregulated utility. They felt that establishing any authority over the nonregulated utility is a form of regulation by the State.

NECPA provides that the inclusion of covered nonregulated utilities in a State Plan is at the option of the Governor. However, the Conference Report is clear as to the conferees' intent with regard to State regulation of nonregulated utilities. It was Congress's intent not to permit the Governor to regulate the rates of nonregulated utilities by reason of their inclusion in a State Plan. NECPA is also clear as to the requirement for adequate State enforcement procedures. DOE anticipates that, in exercising their option regarding inclusion of nonregulated utilities in the State Plan, Governors will take this requirement into consideration.

Several commenters requested that the petition concerning conflict of laws be voluntary rather than mandatory. One requested that the petition be made to a State authority rather than the Secretary in the event of a conflict.

Section 220(2) of NECPA states that NECPA does not supersede any State or local law or regulation except upon a determination of the Secretary that a conflict exists.

The legislative history of NECPA indicates there was concern that, because of the scope of NECPA and its mandated RCS Program, many areas of State and local law might be affected. Section 220 of NECPA was, therefore, intended on the one hand to assure that NECPA would not supersede any State or local laws or regulations unless the conflict between them was irreconcilable, and on the other hand to require that determination of irreconcilability be made by the Secretary rather than by the various State officials or utilities. Section 220 of NECPA provides that such determinations will be made upon petition of a covered utility because it was believed that, as the action agents of the RCS Program, those utilities would identify and be most affected by conflicts between NECPA and these regulations and State and local laws and regulations.

The drafting of Section 220 of NECPA does not make explicit that utilities must petition the Secretary when they believe a conflict exists, but the legislative history is clear that there was no intent to allow utilities to avoid the mandates and prohibitions of NECPA or rules or Plans promulgated thereunder by merely failing to petition and then claiming they

are bound by State or local law or regulation. Accordingly, in § 456.303(b) of the Proposed Rule, DOE required State Plans to require utilities subject to a Plan to petition the Assistant Secretary whenever they believe State or local laws or regulations directly conflict with their duties and prohibitions under NECPA. Nonregulated Utility Plans must contain the same requirements for the nonregulated utility, and any Plan issued under Federal Standby Authority will contain the same requirement. DOE believes such a requirement is necessary to assure that NECPA is adequately implemented, and has not changed § 456.303(b) in the Final Rule.

*C. Exemptions and Waivers for Utility Supply, Installation and Financing—§ 456.304*

Section 456.304 contains some procedural requirements related to utility supply, installation, and financing. Few commenters chose to address these provisions.

Regarding utility financing activity, some utilities expressed concern that the requirement for "fair" interest rates could prohibit zero interest financing activities. Utilities installing some measures at no cost to the consumer as part of the audit had similar concerns. Some felt that these requirements are redundant considering the listing requirements. At least one utility expressed concern that its financing activity might have to be expanded to include other measures.

In addressing "fair" interest rates, DOE notes that the conferees intended that the term "reasonable prices and rates of interest" be interpreted as a "ceiling" rather than a "floor" for such prices and interest rates. The conferees fully intended to allow interest rates below those prevailing for loans. DOE intends that zero interest financing programs by utilities be allowed to continue. Similarly with "fair" prices, DOE considers that free supply or installation of measures complies with requirements of this Section. The concern with both prices and interest rates is abuse in terms of excessively high prices and rates that might be charged by utilities because of their lead role under the Program, rather than artificially low prices and rates. The requirement not to discriminate unfairly among measures is not meant to imply that a financing program must be expanded beyond its present scope. In fact, the expansion of utility financing programs as related to measures is explicitly prohibited.

The Columbia Gas Distribution Companies expressed concern that procedures to insure fair prices and interest rates may be in conflict with Federal antitrust laws. The Public Utility Commissioner of Oregon supported DOE's non-prescriptive treatment of fair prices and interest rates. On the other hand, the Massachusetts Office of Energy Resources requested guidence in judging anticompetitive behavior.

DOE feels that determination as to fair prices and interest rates is best done on a case by case basis and declines to specify what considerations must be made in such a determination. DOE does not feel that a review of prices and interest rates by the State is a violation of antitrust laws.

*D. Scope of Benefits—§ 456.305*

The Proposed Rule stated that eligible customers would be entitled under certain circumstances to the following benefits: a Program warranty, guarantee of compliance with standards, enforcement of these standards through post-installation inspections, billing of services, and access to the conciliation conference to resolve disputes. At a minimum, all benefits were to be available when installation was arranged, with billing services and the conciliation conference available when financing was arranged.

There were 31 commenters who discussed the benefits section specifically. Nearly two-thirds (20) of the comments received came from utilities, while the next largest group (7) of commenters was State agencies. Other comments came from public interest groups, a private citizen, and a contractor.

Seven commenters strongly recommended that the entire benefits section be deleted. One utility recommended deletion of Part (b), which describes when benefits take effect. The reasons advanced for these recommendations varied widely.

Several utility representatives suggested there is no statutory basis in NECPA for the section, while another utility (the Minnesota Gas Company) suggested that the necessary issues are adequately covered elsewhere. Also, several utilities were concerned that the benefits section exposed them to liability problems.

DOE disagrees with commenters who recommended deletion of the scope of benefits section or paragraph (a). Four of the five benefits listed in paragraph (a) are requirements of NECPA, and the fifth, post-installation inspections, is a requirement needed to ensure compliance with the program's installation standards. Consequently, DOE has retained § 456.305. However, DOE has changed this Section somewhat to clarify what the actual benefits are.

Moreover, DOE has corrected its Proposed Rule requirement that the warranty apply to caulking and weatherstripping. NECPA does not require a warranty for caulking and weatherstripping, and the Final Rule reflects this exclusion from the warranty requirement.

Many of the commenters requested some alteration or clarification of the rule as to who should be eligible for the benefits and when these benefits should take effect. The Federal Trade Commission expressed concern that consumers would be confused about when the benefits would be available to them. According to several commenters, benefits should be available to all customers who take advantage of the lists of contractors and lenders distributed by the utilities for any kind of installation or financing. One State agency (Colorado) specifically requested that benefits be extended to customers who do *not* use the arranging services.

Two utilities wanted to make benefits contingent upon the customer's requesting and receiving an audit. One of them suggested that the benefits should attach when the customer has received an identifiable list of contractors and lenders. The American Gas Association had two major concerns: (1) that additional requirements not be imposed by the State or DOE on eligible customers in order for them to be entitled to benefits, but on the other hand, (2) States should not be allowed to offer eligible customers additional benefits not originally required by NECPA.

DOE agrees that there may be some confusion for consumers in understanding when the benefits are available to them. However, by requiring an explanation in the Program Announcement of when and how a customer can be eligible for the benefits, and by keeping the benefits as a package which are all available when the customer takes a specific action (i.e., "arranges" through the utility or home heating supplier), DOE believes it has taken every reasonable step in avoiding consumer confusion.

DOE has established only the minimum level at which benefits are available (i.e., arranging); States could expand the number of customers eligible for benefits by setting coverage at a different level (e.g., every customer receiving an energy audit). DOE believes the flexibility for States to expand the coverage of the benefits should continue, and the Final Rule reflects no change in this flexibility. If States, using State authority, want to add benefits to

the RCS Program, neither NECPA nor the Final Rule prohibits such a State action.

NECPA requires that the following benefits be available to customers who purchase measures from suppliers (such as hardware stores or lumber yards) listed by the State: the measures warranty; materials which comply with standards; and access to a conciliation conference. Also, any eligible customer who obtains a loan to purchase materials from such suppliers must be allowed to repay this loan with the utility bill, if the lender agrees. DOE has corrected the Final Rule to reflect the availability of these benefits.

Section IV S of this Preamble discusses the scope of benefits for State measures included by a State or nonregulated utility not included in a State Plan.

*E. Program Measures and Categories of Buildings*

Over 200 comments were received regarding suggested measures and categories of buildings, the majority of which were made by utilities, with State agencies and contractors also commenting.

NECPA requires DOE to identify the suggested measures for residential buildings, by climatic region and by categories determined by the Secretary on the basis of type of construction and any other factors the Secretary deems appropriate. DOE published in Appendix I to the Proposed Rule tables of measures suggested for residential buildings and in the various climate zones. The Proposed Rule required that these measures be included in the Program Announcement and be considered during the on-site audit.

Many commenters objected to calling these measures "suggested," fearing that customers would be mislead into thinking that the measures were appropriate for their residences where in fact they might not be appropriate. Also, many commenters criticized the particular measures DOE selected—in some cases because the measures were underinclusive and in some cases because they were overinclusive—because they did not wish to "suggest" the measures selected by DOE.

DOE has replaced the term "suggested measures" with the term "Program measures." This change eliminates the implication that any measure is recommended for installation in a particular home by DOE, the State or the utility solely because of its inclusion in the Program. The purpose in specifying the Program measures in Appendix I is to define the minimum list of measures which must be addressed in the Program services, such as the Program Announcement, the audit, and the lists of contractors. DOE does not require any State or utility to recommend any Program measures, but only to provide information and services about them.

Subsection 456.306(c) states that the categories of buildings in this section are the same as those in Appendix I for Program measures. DOE wishes to point out an important area of flexibility for States and utilities in combining or separating these categories. The principal purpose of the categories in the Program is to specify the list of measures which are appropriate for a customer's house. Each customer must see savings in the Program Announcement for the list of measures which is appropriate to his or her house. However, the Program Announcement need not actually use the same terms or present the same categories to the customer as are found in the Rule. For example, if the list of Program measures in a State is identical for the categories "gas" and "oil", the Program Announcement could present these as one category. Or, in an area where many houses are heated with propane and butane, the category "gas" could be split into two categories for "natural gas" and "propane or butane." Savings estimates could then be presented for typical buildings in each category to clearly show any differences in savings for these fuels.

Section 456.306(a)(2) has been modified to conform to NECPA and to clarify that savings must be shown for a "typical building or buildings in such category." Substantial flexibility also exists here in how these savings may be displayed. For example, in many States, homes which are heated with natural gas (and which are therefore in the category "gas") could be split into two subgroups depending on whether they have central airconditioning or not. Though the list of Program measures must be identical for these two subgroups, different savings could be shown for each. That is, savings for a typical airconditioned house could be shown in one column and savings for a typical house without airconditioning in another column. Many similar examples exist, and DOE encourages States and utilities to design that presentation of savings which they believe will be most effective, within the minimum requirements.

As with other terms in the Rule, e.g., the Program Announcement, the Program audit, etc., the term "Program measures" need not appear in any materials received by customers. *In marketing the RCS Program, States and utilities have flexibility in the choice of their terms to make the Program as attractive as possible.* Of course, whatever terms are used, the requirements of NECPA and this Rule apply.

*Renewable Resource Measures.* Respondents suggested that the decision regarding inclusion of active and passive solar systems and wind systems as Program measures not be made at the national level, but be left to the States. It was suggested that these measures should only be included in those geographic areas that a State believed would benefit from it. Commenters from the States of Pennsylvania, Missouri and Iowa wanted solar and wind systems deleted from their lists of Program measures, saying that these systems are not cost-effective in their States. Oregon wanted solar domestic hot water systems and wind energy systems as Program measures for its State, and Vermont wanted active solar space heating as a Program measure in its State.

Many commenters addressed wind systems. Most of the comments regarding the appropriateness of wind systems were offered by gas and electric utilities and State Energy Offices. The 40% enhancement of NOAA wind data used to evaluate the cost-effectiveness of wind energy as discussed in the Proposed Rule Preamble was described as excessive and unjustifiable.

The appropriateness of solar domestic hot water applications for several specific regions was also questioned by several utilities, with some protesting its inclusion on its list, and others suggesting its inclusion where it was not on its list. The Congressional Office of Technology Assessment also questioned the appropriateness of several elements of the DOE evaluation procedures, arguing for solar in more areas.

In response to comments, DOE has re-examined each step in its applications assessment leading to the inclusion of renewable resource measures in the measures subject to audit. The solar insolation and other climatic data were examined for completeness and accuracy; the costs of typical solar systems were re-calculated on a regional basis; details of the analysis procedures and economic model were also reconsidered.

On the basis of this reassessment, each of the generic renewable resource measures determined to be applicable for the RCS Program in the Proposed Rule has been retained in the Final Rule.

Solar domestic hot water is an established technology, generally available, and regulated by established standards. Solar space heating systems

are also well developed as products and regulated by established standards. Passive solar systems and retrofit swimming pool heaters are in common use in some geographic regions. Finally, residential wind system technology continues to advance, largely in response to DOE development and demonstration programs. Moreover, as a result of a re-assessment response to public comment, DOE believes the wind industry is capable of meeting the increased demand that is anticipated to result from the RCS.

The six renewable resource measures considered were:

- Passive Solar Space Heating and Cooling Systems
- Active Solar Space Heating Systems
- Combined Active Solar Space Heating and Solar Domestic Hot Water Systems
- Replacement Solar Swimming Pool Heaters
- Solar Domestic Hot Water (DHW) Systems
- Wind Energy Systems

There are numerous types of energy saving passive solar devices with broad range of installation costs. These costs and the energy savings depend a great deal on the characteristics of each particular residence. In assessing the life cycle economic feasibility of passive solar systems throughout the nation, DOE concluded that the cost-effectiveness of passive systems depends on the particular characteristics of individual buildings, rather than on the characteristic of easily defined broad categories. The auditor will be best capable of evaluating the applicability of passive systems. Therefore, passive solar devices were designated as Program measures everywhere, and applicability criteria have been added to the audit criteria.

In the case of replacement solar swimming pool heaters, it was considered that the high insolation level available in any location would enable the heater to displace enough conventional fuels to show favorable life cycle economics in all regions. Therefore, swimming pool heaters are Program measures everywhere.

In the case of solar DHW, active solar space heating, combined solar space heating/DHW, and wind energy systems, a detailed consumer-oriented life cycle economic analysis was carried out to assess the economic feasibility of installing each of these systems in each State. Sizes and total current costs of prototypical systems, representative of the current state of technology, were determined for typical residential applications on a regional basis. That is, for example, the prototypical solar system configuration was specialized to the climatic conditions regionally, as suggested by the Office of Technology Assessment. The costs used in the calculations included the cost of installation by a contractor.

The economic analysis determined the 20-year costs to the consumer, with and without the particular solar measure. Existing Federal tax incentives were taken into account. The analysis did not account for State or local tax incentives, as these are too numerous and variable in nature for a national-level analysis. States are encouraged to account for these tax incentives while assessing the potential for additional measures on a State basis.

Current average statewide prices for natural gas, heating oil, and electricity were developed from the most credible data bases available. These fuel prices were assumed to escalate in accordance with estimates made by DOE's Energy Information Administration through 1995 for each of the ten DOE regions. Fuel prices were assumed to escalate in conformance with general inflation after 1995. Insolation and wind speed information for the U.S. climatic regions was obtained from the most current data base of the National Oceanographic and Atmospheric Administration (NOAA). These data were based on long-term collection of meteorological information at over 200 measuring stations. Solar insolation levels were considered to be relatively stable throughout each of the NOAA climatic regions and therefore were used directly in the analysis. Wind speeds, on the other hand, can vary widely over relatively short distances, making the use of measuring station data for a large area inadvisable.

Recent meteorological research by the Battelle Pacific Northwest Laboratories for DOE has resulted in the preparation of a wind atlas for the Northwest United States. This atlas contains estimates of annual and seasonal mean wind speeds in 15 mile by 15 mile grids throughout the Northwest region. The Battelle data were compared with the NOAA measuring station data in the Northwest and it was found that a representative, well-exposed site in the Northwest would have an annual mean wind speed 1.4 times that observed at the nearest measuring station in the regions. Therefore, in the absence of site-specific wind speed measurements for a given residence and without the wind atlases for the balance of the country (which will not be available for 1 to 2 years), it was decided to retain the 40% enhancement of NOAA wind measuring station data throughout the United States to represent the wind resource level that would be expected at well-exposed sites in any climatic region. In agreement with numerous commenters, DOE recognizes that this method of assessment, especially for wind systems, will identify program measures for sites that an on-site audit would later dismiss as infeasible or not cost-effective. To reduce the cost impact on the utility companies to conduct the audits, DOE has included applicability criteria, in Section 456.307 of the Final Rule with which an auditor can quickly rule out certain measures, especially wind systems, based on only a cursory examination of the house and its site.

The table of Program measures reflects the revised conditions of assessment, as well as the decision by DOE to present the measures on the basis of HUD–MPS regions per State. Use of the HUD–MPS regions is responsive to numerous requests to better integrate the measures lists for conservation and renewable resource program components, thereby simplifying the regulations.

The renewable resource measures were analyzed in each of the NOAA climatic zones decribed in Appendix I(B) of the Proposed Rule. The climatic zones were then aggregated into the HUD–MPS regions. If a measure was cost-effective in NOAA zones covering less than 50 percent of the HUD–MPS zone in any one State, that measure was not included as a Program measure for that zone.

Examination of the tables shows, for Solar Domestic Hot Water, that the coverage by State has remained largely unchanged from the Proposed Rules to this Final Rule. Forty-two States (including Puerto Rico and the District of Columbia) retain about the same geographic coverage, eight States have more solar DHW coverage, while geographic coverage has been reduced in Ohio and Vermont.

A major change from the Program measures of the Proposed Rules is that the use of solar DHW has been assessed for cost-effectiveness relative to each fuel type, and determined to be a Program measure on this fuel-specific basis. This approach is responsive to the request of several gas utilities and the American Gas Association. It is a departure from the prior DOE policy of including solar DHW in a climate region, for all fuels, if it was found to be cost-effective relative to any fuel in that region.

The coverage of wind systems as Program measures remains basically the same. Forty-one States including Puerto Rico and the District of Columbia retain

about the same coverage; nine States have reduced coverage; while two States, Kentucky and Wyoming, obtained increased coverage.

The major changes are in the categories of solar space heating and combined space heating and domestic hot water. The States of Idaho and Nebraska now contain regions for which solar space heating is included in the program, while the States of Arkansas, Delaware, Idaho and Nebraska join the more southerly States in producing cost-effective opportunities for combined solar space heating and domestic hot water systems. These additions reflect, for the most part, the dramatic rises in fuel costs since the analysis for the Proposed Rule and the revised projection of fuel costs over the 20-year future. The State may propose other renewable resource measures for its State in its State Plan. See Section IV S of the Preamble for further discussion of State measures.

*Energy Conservation Measures*

Suggested levels of ceiling, duct and floor insulation were commented on by over half of the respondents. The general consensus was that the suggested levels of duct and ceiling insulation were to high. It was recommended that the suggested level for duct insulation be lowered to R–7. Many commenters stated that levels of R–19 and R–14 would be physically impossible to install in most homes; the energy savings would not be enough to make it cost-effective; and insulation packaged for these levels would not be commercially available. Some commenters suggested that R–7 be required and R–14 be recommended when possible. Maryland, Florida, and Texas wanted the duct insulation level for their States to be R–6.

Most of the respondents wanted caulking and weatherstripping to be suggested measures for all climate zones. Storm or thermal doors and storm or thermal windows were also recommended as suggested measures for all climate zones. However, most commenters from Texas felt that storm doors and windows were not cost-effective in their area.

Ceiling insulation levels were also described as excessive. Most commenters recommended lowering these levels to R–30, because R–38 and R–49 are not cost-effective and might be impossible to install. The feeling was that the levels recommended were unrealistic from a cost recovery viewpoint. Commenters from the States of Texas, Louisiana, North Carolina, South Carolina, Arkansas, Michigan, and the Tennessee Valley Authority region recommended floor insulation levels of R–19 for their climate zones. One person suggested that local insulation level standards should prevail where they met or exceeded the Federal standards.

Both the content of the tables of Program measures and the requirements for their use have been changed substantially in order to increase the flexibility which the States have in designing their Programs. First, any energy conservation measure or renewable resource measure contained in the definitions in § 456.105 may be added as a State measure by a State to its Program. See Section IV S below. For example, if storm doors are not included for a particular State, they may be added to all audits and other services. Second, as described below in section IV S of this Preamble, other measures may be added in the State Plan as "State measures," subject to DOE review. Third, measures which are Program measures in one HUD-MPS region in the State, but not another, may be made State measures in the regions where they are not Program measures.

The fourth change in the tables of Program measures is that the levels of ceiling, floor, and duct insulation have generally been reduced and are designated as minimums. A State may replace DOE's minimum level with any higher one, subject to DOE approval. A State may propose to add as a State measure a lower level for the purpose of auditing an additional level.

The levels of insulation and the structure of tables of Program measures have been changed to respond to comments on three different problems with the Tables: First, to lower the insulation levels which were too high; second, to make the renewable resource measures and energy conservation measures tables consistent; and third, to make the tables more consistent with an existing Federal conservation standard, the Minimum Property Standards (MPS) of the Department of Housing and Urban Development (HUD). We have used the most recent version of the HUD–MPS as published in the **Federal Register** on April 16, 1979, at page 22451.

The numerous comments received concerning special recommendations for different climate zones were State-specific. Among the recommendations were: Hawaii should not be in Zone 6 but in a special zone for subtropical areas; Zone 6 should be subdivided to reflect the unique climatic conditions of all parts of Florida; floor insulation should be recommended for Zones 7 and 8; Denver County should be added to Colorado Zone 4; Gilpin County should be added to Colorado Region 3; and Jefferson, Douglas and El Paso Counties should be changed from Zone 3 to Zone 4. One commenter suggested that climate zones be optional. Another suggestion was to make the climate zones broader.

The climate zones in the HUD–MPS and this Final Rule are based solely on heating degree days. However, savings in air-conditioning costs have been taken into account in those climates where air-conditioning is prevalent.

As in the HUD–MPS, the ceiling and floor insulation levels, and the requirements for storm windows and doors and wall insulation, are identical for homes heated with gas and oil. The levels for homes with electric resistance heating (such as electric furnaces or baseboard heating) are higher in some climate zones. The measures for homes with heat pumps are the same as those for gas and oil heated homes in zones of less than 5000 heating degree-days. They are the same as those for electric resistance heating in zones with more than 5000 heating degree-days. Though many commenters requested that the levels be identical for heating fuels, DOE agrees with the HUD–MPS that a separate level for electric heating is frequently cost-justified. However, the provision in this Rule governing State measures may be used to eliminate the distinction between residences heated with different fuels, as long as all measures for each fuel type are included in the list for the combined category. For example, if a State wished to make the insulation levels identical for all houses, those of the lowest building category (in most cases, natural gas) could be raised. Thus ceiling and floor insulation levels for the combined category would be the same as the highest levels of the four fuel types.

All other energy conservation measures are Program measures for all houses. The measures are: caulking and weatherstripping, replacement furnaces, or boilers, duct and pipe insulation, water heater insulation, heat reflective and heat absorbing window and door material, replacement control air conditioning and clock thermostats.

These requirments are different from those of the Proposed Rule in the following ways. First, caulking and weatherstripping are now included for all homes. As many commenters pointed out, caulking and weatherstripping can be cost-effective in virtually all homes. Second, vent dampers have been deleted for oil-heated homes, because DOE believes standards for these installations are necessary but are not yet available. Vent dampers have been retained in the Program for gas furnaces. DOE will shortly propose for comment

an installation standard for vent dampers for gas-fired furnaces which DOE believes is necessary to assure safety and effectiveness.

DOE is working with HUD and the Farmers Home Administration of the Department of Agriculture to make the various Federal recommendations for conservation in housing consistent. DOE anticipates that the MPS will next be modified when the DOE Building Energy Performance Standards are made final. DOE's tables of Program measures will be modified at that time. However, these changes in the Program measures will not take effect until the second Program Announcements are prepared as described in § 456.306(a).

*Categories of the Buildings*

Many commenters stated that the base for computing cooling degree-days should be adjusted from 65°F to 70°F. Several stated that accurrate cost estimates for passive and active solar systems could not be obtained using DOE calculations. It was also suggested that a mobile home category should be added to all the tables. Two commenters wanted the entire section deleted and broad rules substituted in its place.

The categories of buildings in the Final Rule have been moved from § 456.306 to Appendix I. The categories are almost identical to those in the Proposed Rule, with a few exceptions. First, homes with heat pumps have been separated from those with electric resistance heating. As many commenters pointed out, the cost-effectiveness of measures in homes with heat pumps is different than that for other electric heated homes. However, the category "heat pump" is not used for solar domestic water heaters, since the heat pump is not used for water heating. Second, homes which use propane or butane as the principal heating fuel have been moved from the category "oil" to the category "gas." Several commenters pointed out that propane and butane heating systems are physically very similar to natural gas systems, and that the furnace efficiency modifications for gas furnaces were more appropriate. Third, the categories for wind systems are the same as those for conservation measures, since the appropriateness of wind systems was analyzed with respect to each of these categories. Section IV. F, below contains a further discussion of the importance of these categories.

The building types used for the designation of Program measures for active solar heating and combined active systems remain as single-family detached, attached buildings and mobile homes. DOE considered adding a separate category of mobile homes for conservation measures. However, most of the conservation measures are applicable to mobile homes, with the exception of ceiling and wall insulation. For these two measures DOE has allowed the auditor to determine that they are not applicable if the customer lives in a mobile home. Also, DOE has expanded the definition of floor insulation to include skirting in the case of mobile homes.

The Program measures table reflects the following analysis of renewable resource measures:

1. Solar domestic hot water systems were compared to conventional electric and gas- and oil-fired domestic hot water systems, respectively. The electric heat pump category is not applicable in this case.

2. Solar space heating and combined solar domestic hot water/solar space heating systems were compared with conventional systems separately supplying domestic hot water and space heating. Both were assumed to use the same fuel (electricity, natural gas, or oil, respectively). The electric heat pump case included a conventional electric domestic hot water system.

3. Wind systems were compared to conventional systems in three different profiles of electricity use. Different size wind systems were used in the analysis for each profile. In each profile, the wind system was only providing electric power which displaced a portion of the electrical demand of the residence rather than producing electricity for resale to the utility as well. The electricity-usage profiles considered were:

- Electricity—general lighting and applicances, electric domestic hot water, electric resistance heating, electric air conditioning.
- Natural Gas and Oil—lighting, appliances, and domestic hot water supplied by electricity; houses heated by natural gas or oil. The space heating system remains unchanged even if a wind system is installed since the wind system output is *not* providing energy for space heating.
- Electric Heat Pump—lighting, appliances and domestic hot water provided by electricity. Space heating and cooling supplied by electric heat pump.

*F. Program Announcement—§456.306*

Respondents to the Proposed Rule felt strongly about the scope and content of the Program Announcement. Of the more than 240 comments addressed to § 456.306, the largest number came from utility companies, with State Government offices next. Major issues identified by the respondents were: (1) the expression of savings estimates of the installation of suggesfed measures and conservation practices in dollar amounts; (2) the scheduling of distribution of the Program Announcement; (3) the intent and content of the Program Announcement; and (4) the load management disclosure. The comments also dealt to a lesser extent with building categories, new customers, tax credit information, and other issues related to the general content of the Announcement.

Sections 456.306 (a) (2) and (a) (4) of the Proposed Rule specified that the Program Announcement must contain reasonable estimates of the savings in energy costs, *expressed in dollars,* for the installation of suggested measures and the adoption of conservation practices. Almost all respondents objected to this requirement. The alternative mentioned most often was to express the savings as a percentage of the fuel bill. The many variables involved (family size, life style, energy consumption patterns, residence type and size, inflation, and fluctuating fuel prices) were often cited to support the position that an accurate dollar amount would be extremely difficult to calculate. Other suggestions were to express the savings in energy units (dependent upon fuel used) or to state the auditor would calculate the savings at the time of the audit.

Quite few respondents suggested that cost estimates for installations and energy savings should be deleted from the Program Announcement altogether. Consumer advocate groups and a few State Government offices were the main proponents of extremely detailed savings estimates.

NECPA requires the Program Announcement to include, "the *savings in energy costs* that are likely to result from installation of the suggested measures in typical residential buildings in such category," (Section 215(a)(2), emphasis added). Consequently, DOE cannot eliminate from the Final Rule the requirements for providing savings information and expressing the savings in energy costs. However, DOE, in the Final Rule, allows energy savings to be expressed in dollars, ranges of dollars, or as a percentage reduction in energy bills.

The Proposed Rule did not require the inclusion of program measures costs in the Program Announcements. The Final Rule also does not require such costs to be in the Program Announcement.

NECPA requires that each covered utility and participating home heating supplier provide each of its eligible customers with the information

contained in the Program Announcement. Although a number of commenters suggested that the utility or home heating supplier which provides the heating fuel for the customer be the only person required to send the Program Announcement, DOE rejected this approach because it does not meet the requirements of NECPA.

The amount of detailed information required in the Program Announcement elicited many responses. The intent was perceived to be "a way to sell audits," to motivate people directly to install energy conserving equipment and to adopt energy conserving practices in their homes. Phrases like "information overkill," "not to be a textbook on energy engineering" and "should not be vehicle for technical information" abounded in the comments. One respondent suggested that "mandatory items of inclusion should be kept to the barest minimum. What is not necessary to the 'selling' of the audits should be left out." Many respondents commented that the Program Announcement as proposed would not be read and should be developed along the lines of an attention-getting bill stuffer.

A two phased approach for the Program Announcement was also suggested. The first phase would be a short summary of the RCS Program, stating that additional information would be available upon request. The second phase would be similar to the proposed Program Announcement and could contain a tear-out to request an audit.

DOE does not believe the Program Announcement as required in the Proposed Rule would be "information overkill," but rather believes that it could be, through creative marketing, an attractive information piece which would motivate customers to request audits, if not to purchase measures directly. As a result, the requirement for a Program Announcement is retained in the Final Rule. At the same time, DOE believes that, in order to allow for various effective marketing strategies to be used by utilities and home heating suppliers, it should provide additional flexibility in this area. Consequently, the Final Rule contains provision the State to propose in its State Plan an equivalent means of distributing the initial Program Information. If DOE determines that the State's proposal is equivalent to the Program Announcement in terms of ensuring that customers receive a full description of the economic benefits of energy conservation, including renewable resources, and the availability of the services and benefits of the RCS, within the time limits of NECPA, DOE will approve the alternative.

Many respondents commented unfavorably on the requirement for the initial distribution of the Program Announcement to all eligible customers within six months after the approval of the State Plan. The consensus was that a large demand for audits would be stimulated and backlogs of audit requests would ensue. To prevent customer dissatisfaction and encourage participation, it was suggested that the Program Announcement be distributed over a longer period of time at either staggered intervals or over the course of at least one year, or to specific geographic regions, or to a percentage of the utilities' customers.

Respondents questioned the necessity of each utility sending Program Announcements to the same customer. The need for a cooperative effort among various utilities supplying customers in the same area to avoid duplication of effort was mentioned frequently. It was suggested that the supplier of the fuel or energy used for heating or a designated State agency be responsible for the distribution of the Program Announcement.

DOE agrees that sending the Program Announcement to all customers within six months of the approval of a State Plan could stimulate a demand which would be difficult to meet without a temporary expansion of the number of auditors utilized by utilities. However, the six month requirement is contained in NECPA. Consequently, DOE cannot simply waive the requirement in its Rule.

A number of States and utilities suggested that DOE allow audits to be staged or scheduled on a more even demand basis by neighborhood or customer energy use. This approach has been adopted by DOE in its Final Rule. The offer of a Program audit in the Program Announcement can be conditional on providing audits on a geographic basis (e.g. neighborhoods, communities) or on amount of energy used (e.g. higher users first, users which pay a higher proportion of their disposal income for energy). A description of any conditions must be in the State Plan along with a procedure for recontacting individual customers when audits are available to them. The Program Announcement should also provide an indication as to the approximate time at which audits will be available to the customer. At a minimum, all customers must receive an unconditional offer for a Program audit once every two years or within a shorter time specified by the State. In order to ensure that once a customer has requested a Program audit, it is provided within a reasonable time, the requirement in the Proposed Rule that States determine an adequate period of time for fulfilling a customer request for an audit is retained in the Final Rule.

Several utilities suggested a particular staged or phased approach to providing the information required in the Program Announcement. This approach would, according to the recommendation, be stretched over six months with, for example, Program measures savings shown in the first or second month and the offer for an energy audit sent out two to four months later. This approach would be unacceptable to DOE because it separates the motivation for an audit (i.e., energy savings) from the offer for the audit.

The requirement for a load management disclosure was commented on by more than 80 respondents. Nearly all of these commenters suggested that this disclosure be eliminated from the final regulations. Reasons given were: (1) it was discriminatory against electric utilities that did not offer time-of-use rates or load control rates; (2) load management devices are designed to control peak demand, not to conserve energy; (3) the average customer would not understand such a disclosure; and (4) the disclosure was an attempt to implement the load management standard of the Public Utility Regulatory Policies Act (PURPA) of 1978. Several utility companies with existing load management programs also advocated the deletion of the disclosure for the above reasons. Three respondents suggested that the disclosure should remain in the Program Announcement only in areas where residential customers were familiar with this concept. Two respondents favored a blanket inclusion of the disclosure in all Program Announcements.

DOE believes that there are real savings associated with the adoption of time-of-use rates and encourages utilities to adopt such rates where there are no such rates. However, DOE agrees that the load management disclosure may cause confusion and has dropped this requirement from the Final Rule.

Several comments dealt with the issue of offering previous audit results to new occupants. The majority opinion was not to do so. Reasons cited were: (1) it might be construed as an invasion of previous customers' privacy; (2) if an audit had been performed, a new customer would not be aware of which measures were installed by the previous occupant after an audit; and (3) new customers would receive program information during the two year cycle of Program Announcement distribution.

The requirement that energy audits results be provided, upon request, to new customers owning a residence already audited under RCS is a requirement of NECPA. Consequently, DOE has not changed the requirement in the Final Rule. The requirement that new customers receive a Program Announcement is also contained in NECPA and is retained in the Final Rule. NECPA also requires that a new customer receive an offer from the utility or home heating supplier for an audit and the arrangement services of the utility.

Several utilities thought that they did not have the expertise to handle adequately any calculations concerning active or passive solar systems. They also questioned the necessity for calculations to be "identical" and suggested that "consistent" would be a more appropriate term. A request for a liability disclaimer and some questions about the prohibition against advertising were also mentioned.

DOE agrees with the commenters who felt that the requirement of "identical" savings in different Program Announcements received by the same eligible customer incurred greater costs than the benefits it would produce. Therefore, DOE has changed the Final Rule to require that these savings estimates only be substantially the same, not identical as in the Proposed Rule.

The requirement that no advertising appear in or accompany the Program Announcement is retained in the Final Rule. DOE believes that this is a reasonable requirement needed to ensure fair competition between utilities or home heating suppliers and other suppliers, installers, or lenders.

The Proposed Rule allowed an exception to this prohibition, in that utilities which supply, install, or finance program measures could state that they do so. However, FTC commented that this exception might give such utilities an unfair competitive advantage over other suppliers, installers, or lenders. DOE agrees with FTC with respect to installers and suppliers. To allow utilities, in the Program Announcement to state that they supply or install measures would give them an unfair advantage in advertising which their competitors do not have. Utilities are, of course, free to advertise that they offer these services in other material that they distribute to their customers or through other media. However, with respect to financing, DOE believes that few lenders offer loans for installing energy conservation or renewable resource measures. We therefore encourage utilities to offer such loans, particularly at reduced interest rates, as several utilities now do. We also do not believe that a disclosure in the Program Announcement about the financing would have an anticompetitive effect. The Final Rule thus allows utilities to state that they offer loans for program measures.

Some respondents felt that information about do-it-yourself installation, tax credits and existing programs should be included in the Program Announcement. Greater flexibility for States to add additional measures not suggested by DOE was also recommended.

Information in the Program Announcement on Federal residential energy tax credits and the Weatherization Assistance Program for low-income persons has been added as a requirement of the Final Rule. DOE agrees with commenters that each of these additional information requirements will enhance participation in the RCS Program by providing information which will show customers how to reduce the costs of installing Program measures, as well as the desirability of installing such measures.

*G. Program Audits—§ 456.307*

The program audit, or "inspection" as it is termed in NECPA, is the core of the RCS program. Fifty-four percent of the commenters dealt with this section, a higher percentage than any other section. As with most other sections of the Rule, the largest group to comment was utilities. Other organizations with substantial representation in the comments included State governments, manufacturers, and contractors. A wide variety of concerns was expressed.

The audit requirements have been changed as a result of public comment and further DOE analysis. Many requirements have been reduced, while others have been expanded.

1. *Split Versus Combined Audit.* One of the major questions about the audit was whether it should be one comprehensive audit addressing energy conservation measures and renewable resource measures, or whether it should be split, separating the conservation and renewable resource components. Nearly half the comments about audits addressed this question. Most of these clearly recommended a single audit of some kind; however, there was considerable disagreement on the nature of this audit. A few comments merely recommended one audit without specifying the type. Thirteen utility representatives requested that they be allowed to perform a conservation audit only, either omitting the renewable resource audit entirely (as not cost-effective) or allowing private contractors to perform that part. Some of these comments mentioned only the renewable resource audit specifically, but, at least by implication, these comments indicated that the utilities would prefer to be responsible for an audit for conservation measures only. The largest single group expressed a preference for a combined audit addressing conservation and renewable resource measures in a single visit. A minority preferred two audits. A few of these wanted to include a feasibility study in the conservation audit to determine if the residence would be appropriate for a detailed solar audit. Others wished to make the conservation audit a prerequisite to the renewable resource audit. Other commenters merely requested a clarification of the Rule.

The Final Rule reverses the requirement of the Proposed Rule for the offer of separate conservation and renewable resource audits. The principal reason for this provision in the Proposed Rule was that DOE believed the costs of an audit which addressed both types of measures would be so high as to either deter participation or raise utility costs unacceptably.

However, many commenters pointed out that costs might be very high if separate audits were offered, since the utility might be obliged to visit a residence two separate times, once for conservation measures and once for renewable resource measures. The Final Rule takes the opposite position from the Proposed Rule by requiring that the customer be offered an audit which covers all Program measures (both renewable resource and conservation) as well as the energy conserving practices. Based on public comment and our own further analysis, DOE is confident that an audit which adequately addresses all Program measures and practices can be performed on the average in 2 to 2½ hours by a well-trained and experienced auditor. This provision of the Final Rule also assures that information on both renewable and conservation measures will reach the broadest possible audience.

This provision of the rule does not mean that one person necessarily must perform the entire audit or that the audit must be carried out in one visit. DOE has substantial evidence, however, to believe that it is possible for one person to be trained to address all measures in a particular residence. This can be facilitated by the utility learning the type of furnace from the customer before the audit. However, a utility may

subcontract for all or part of its audit services. But whatever the contracting arrangement of the utility or the number of visits, the customer who requests an audit must receive an analysis of all Program measures.

2. *Restrictions On Auditing For Other Measures.* The Proposed Rule left the impression that an auditor could not address measures that were not suggested measures. There were many objections to this perceived restriction. All of the comments which dealt with this issue requested more flexibility. The Proposed Rule prohibited auditors from estimating "costs or energy cost savings of installing any product which is not a suggested measure unless the auditor specifically states that the product is not a suggested measure." One person commented specifically on this point, seeking to allow auditors to include other measures in their estimates without having to state that they were not "suggested."

The Final Rule has been changed to allow States substantial latitude in adding measures to the minimum list of Program measures which must be addressed in the audit. First, any energy conservation or renewable resource measure which is not a Program measure for a particular location may be added as a State measure subject to DOE review. For example, if solar domestic water heating is not a Program measure in a State, that State may add it to its requirements.

For example, if ceiling insulation level for a particular house in a particular climate zone is R–30 in Appendix I, the State may choose, subject to DOE review, to require the auditor to give cost and savings information about R–22 and/or R–36 levels as well. Second, the State may propose State measures in its State Plan, subject to DOE approval, which are not energy conservation or renewable resource measures if they meet the criteria of Section 456.319. Third, the insulation levels may be raised or added to, as described in the footnote to the tables of program measures in Appendix I. A State may propose to substitute a higher level as a program measure, subject to the Assistant Secretary's approval in a State Plan. Or a State may propose additional levels, either higher or lower, as State measures, for the auditor to analyze. For example, if the program measure level for gas-heated homes is R–30 in Appendix I, the State may propose to require the auditor to give cost and savings information about R–22 and/or R–36 levels as well.

3. *Duplication of Audits.* Most respondents felt that it is sufficient for each eligible customer to have one complete audit available from one utility or fuel supplier, rather than to have the option of receiving an audit from each utility and fuel supplier that serves him. Some suggested that the customer be allowed the option of requesting an audit from any utility in his area. Three of the comments recommended that the utilities in an area work out an arrangement whereby only one audit is performed per residence. Many commenters said that only the utility which provides the principal fuel for heating or air conditioning should be required to offer an audit to its customers.

The Final Rule requires each covered utility to offer a complete audit to each of its residential customers. This is required by Sections 213(a) and 215(b) of NECPA. NECPA does not prohibit a covered utility from subcontracting for its auditing services. It is therefore possible for one utility or home heating supplier to contract with another utility or home heating supplier to perform all or part of the audits requested by its customers. Regardless of the contracting arrangements, though, each utility is directly responsible for providing the audits which its customers request. That is, the utility may not simply refer its customers to a third party but must actually provide the audit.

4. *Time Within Which Audits Must Be Performed.* A few utilities expressed concern about their ability to perform the audits within a reasonable time after receiving a request for an audit from the customer, particularly considering the requirement for distribution of the Program Announcement within six months of State Plan approval. The Rule indicates that the State shall specify "a reasonable time" for completion of audits. All comments received on this issue requested that the implementation schedule be flexible. One suggested that "reasonable time" should take into account the number of customer requests, while others recommended not specifying a particular time period.

Paragraph (a) of the Section 456.307 retains the requirement that the State Plan establish a reasonable time period within which a utility must provide an audit to the customer who requests it. DOE believes that customers will be discouraged if they must wait an unreasonable time to receive an audit after they have requested it. One part of the State and utility planning should be some assessment of the likely demand for audits, so that an adequate number of auditors are hired. Section 456.306(a)(5)(i), which allows offers of audits to be conditioned upon reasonable factors and requires an unconditional offer of an audit within two years of State Plan approval, reduces the risk that audit demand will substantially exceed supply at any given time.

5. *Class B Audits.* There was considerable disagreement whether Class B audits, i.e., audits performed by the eligible customer and mailed to the utility for analysis, should be permitted. The Proposed Rule specified that Class B audits could not be a precondition for the on-site Program audit required in the Rule. Almost all of the commenters requested some change in the rules toward greater flexibility in providing Class B audits in association with the RCS. Some of the comments suggested that the eligible customer should be allowed to choose whether he or she receives an on-site Program audit or a Class B audit. Others suggested leaving the choice up to the State. Still others recommended a Class B audit as a prerequisite to the on-site audit.

There was a great deal of comment on the comparative effectiveness of on-site audits and Class B audits. DOE, however, believes that Program audits are more effective in conveying cost and savings information to customers and in encouraging further action by the customer, and are more accurate in the results they produce because the data about the house is collected by a person trained in home energy analysis. There are very few studies which clearly compare the energy savings achieved by each class of audit. DOE, nevertheless, changed the Rule to allow Class B audits in association with the RCS Program. Since NECPA requires utilities to offer on-site audits, the Rule retains the prohibition against a precondition of a Class B audit for receipt of the on-site Program audit.

Class B audits offered in association with the RCS Program must meet the criteria specified in this Final Rule. The utility may continue to offer its customers Class B audits that do not meet these criteria, but not under the auspices of an RCS Program.

As discussed above in Section II. B. of this Preamble, two new terms have been included: "program audit" and "Class B energy audit." Section 456.307(h) includes criteria which apply to Class B audits conducted under the auspices of the RCS Program. These criteria were added to assure the integrity of the RCS Program and therefore are necessary to implement NECPA.

6. *Supplementary Information Provided in Audits.* Subparagraph (d) contains the minimum list of supplementary information which the auditor must provide to the customer along with the cost and savings

estimates. The Proposed Rule also listed supplementary information the auditor must provide. Several commenters requested additions to this list. About half of those comments recommended more do-it-yourself information; a few recommended requiring material on tax credits; and others wanted information on other building conservation programs, particularly the Weatherization Assistance Program for low-income persons, to be included.

Three items have been added in this Final Rule: information for do-it-yourself installation of certain Program measures; information regarding the Federal tax benefits for which the customer may be eligible; and information about eligibility for assistance under the Weatherization Assistance Program for low-income persons. DOE believes that there is widespread interest in each of these items and that it is easy for the auditor to provide it.

7. *The "in-Person" Requirement.* The Proposed Rule required that audit results be presented "in-person" to the eligible customer. Some respondents felt that in-person presentation of audit result would be more effective in persuading customers to take action than results mailed after the visit. Many claimed that a return visit to deliver the audit result would increase costs, complicate audit procedures, and cause inconvenience to customers. The majority recommended that in-person delivery of result should not be required.

Many suggested that the results be mailed or phoned. Some recommended that a follow-up in person or by telephone be provided if the customer requested it. Several comments stressed flexibility, recommending that the choice of the most effective delivery method be left to customers, States, or utilities.

The principal arguments against in-person delivery of audit results were that it would require two visits to the home and therefore greatly increase costs, and that it would produce no appreciable difference in energy savings. Most audits, it was argued, will be conducted during normal working hours when one or both decisionmakers of a husband-wife household will be away from home. Also, whereas the auditor is not a salesperson, he will not use the opportunity to persuade the customer to take further steps.

The final Rule retains the requirement for delivery of the results of the audit in person, with a modification. There are three reasons for this provision. First, regardless of who is home at the time of the audit, DOE believes that in-person delivery will assure a greater understanding of the results of the audit and of the further services which the Program offers. Second, DOE believes that in-person delivery does not necessarily mean higher costs for the audit. Several utilities currently provide single-visit audits with in-person delivery of results at a cost no higher or only slightly higher than other utility audits. DOE does not intend the in-person delivery of results to require two visits. In fact, DOE encourages utilities and States to select audit procedures which involve only one visit to the home as a way of keeping costs low. Also, if the customer is not present during the audit or otherwise declines in-person presentation, the utility is relieved of any obligation to deliver results in person.

Third, DOE believes that in-person delivery provides a better opportunity for the auditor to attempt to motivate the customer to take some energy conservation action. DOE acknowledges that this position is based more on judgments about strong marketing techniques and a desire to encourage utilities to try to sell conservation to its customers, rather than on any firm data that in-person delivery has been shown to save more energy. Therefore, DOE has written Section 456.307(c) to allow states to propose alternatives to the in-person delivery of results which they believe will be equally or more effective in motivating consumers to take action. These alternatives need not be solely methods for delivering audits results, but can include such motivational techniques as the State chooses to propose.

8. *Cost and Savings Estimates.* The Proposed Rule required the auditor to provide an estimate, expressed in dollars, of savings in energy costs which would occur over a specified period of time from installation of suggested measures. Expressing savings as a percentage was favored by many of the respondents commenting on this issue. Some felt that savings should be in a range of dollars and percentages. Difficulties in providing realistic estimates were also discussed.

Section 456.307(c) requires cost and saving estimates to be expressed at a minimum in dollars or a range of dollars. Single savings figures (such as $45 per year) have the advantage of appearing more definite or conclusive to the customer, but they can also be misleading. DOE knows of no estimation technique which has been shown to be accurate to the nearest dollar. Therefore, the Final Rule allows the State to choose whether, at a minimum, to express savings as single estimates or ranges of dollars. The State may also require or allow percentage savings estimates in addition to the dollar savings estimates. In either case a disclaimer must be provided to the customer about the validity of this estimate.

9. *Audits for Renewable Resource Measures.* The Preamble to the Proposed Rule suggested that the audit of renewable resource measures may necessitate the inclusion of additional information in the audit results. Because of substantial variation among the products that a customer may purchase, DOE has specified in its audit procedures for solar domestic hot water systems or active solar space heating systems or combinations thereof, that the auditor provide information regarding the solar system upon which the auditor is basing his savings estimates.

The Proposed Rule contained requirements in section 456.702 that the construction and installation of solar domestic hot water and active solar space heating systems comply with the *HUD Intermediate Minimum Property Standards Supplement.* In the Appendix to this document is a procedure for sizing of systems based on the F-chart model. In its comments on the Proposed Rule, the Federal Trade Commission commented that this procedure is a good procedure and recommended that it receive more attention in the Rule. In addition, various representatives of the solar industry testified that this model is the basis for their "audits" of residences. Therefore, DOE has included in section 456.307 of the Final Rule a requirement that this model or its equivalent be used as the basis of the solar audit. The model is nonproprietary and is available in the marketplace.

Three commenters suggested that the renewable resource audit could be simplified. It was felt that the provision of detailed and highly technical information on solar systems would be incomprehensible to most homeowners and that general background information would be sufficient. Difficulties in providing realistic estimates of annual maintenance costs were stressed.

DOE does not believe that the requirements of the Proposed Rule for providing certain descriptive information about solar systems was either unnecessary or likely to be confusing. The Final Rule has added other information which must be provided. DOE believes this information to be important to any person considering installation of a system. DOE also believes that it can be presented simply and easily by the

auditor in printed form. DOE agrees that realistic estimates of annual maintenance costs are difficult to develop, but they are important in the homeowner's consideration of the cost of a solar system. As part of its model audit procedures, DOE intends to provide the best available data which meets this requirement.

Comment included suggestions that solar domestic hot water should be included in all renewable resource audits. Passive solar space heating and cooling were described as helpful in decreasing energy consumption, but there appeared to be some differences of opinion as to what measures constitute passive cooling devices. Auditing wind energy systems was cited as being impractical and inappropriate.

Solar water heating has been included in the program in those areas where DOE believes it is likely to be cost-effective, as described above in IV. E. States may propose to expand its coverage according to Section 456.319. The definition of passive solar systems has been modified to include one specific set of passive cooling devices, window shading. DOE believes that useful information about the costs and savings of wind devices can be provided as part of a basic RCS audit and intends to provide model procedures for doing so. This subject is discussed further below under calculation procedures.

A few respondents expressed concern about the availability of auditors qualified to perform renewable resource audits. Many felt that the calculations required for this type of audit are beyond the scope of a utility auditor and would require the expertise of an architect, mechanical engineer, or contractor. The need for much guidence and information for utilities and consumers on solar systems was often expressed.

In combining the audits, DOE has simplified the renewable resources portion of the audit by eliminating some of the analysis of costs and by adding the applicability evaluation (discussed below). In addition, DOE will provide as technical assistance a model audit which will give methods for estimating costs and savings of each renewable resource measure. Because the audit has been simplified, DOE does not believe an architect, mechanical engineer, or contractor would be required to perform the audit. DOE believes that a utility auditor could address all measures.

10. *Furnace Audits.* Six of the respondents felt that any furnace inspection should be the responsibility of the utility or supplier providing the fuel for that space heating system. One suggestion was that a utility should have the option of performing an audit or passing the request on to the heating fuel supplier. The question of whether a utility can subcontract the audit to a fuel supplier or auditing firm was raised. One concern was that competing energy suppliers performing audits on furnaces using a fuel other than the type they supply have conflicts of interest. It was suggested that in these cases auditors should be prohibited from recommending fuel conversion. If conversion recommendations are allowed, it was suggested that the auditor must provide a comparison of the energy usage of the existing and replacement systems.

The Final Rule requires that each energy audit must address all Program measures. Replacement furnaces are Program measures for every home. Therefore, each utility must be prepared to audit the furnace in every home which they serve. As mentioned above, the utility may choose to subcontract the furnace audit. For example, an electric utility may hire an oil dealer to test the efficiency of the oil furnaces in their customers' homes. In this case, the utility is responsible for making sure the furnace is inspected and for presenting the results of the entire audit to the customer. The utility does not "arrange" an audit with such a contractor; the contractor is the agent of the utility.

This requirement for furnace inspections is based on our interpretation of the two provisions of NECPA which address furnace audits. Section 213(b)(2)(B) of the law prohibits a utility from inspecting a furnace unless the customer requests such inspection in writing. Section 215(b)(1)(A) requires the utility to offer an inspection of all Program measures ("suggested measures" in the law), including furnace modifications. DOE interprets this to mean that the utility must offer to provide an audit of all Program measures, and must ask the customer who requests an audit to sign a release if that customer's residence is heated by a furnace fired by different fuel than the one the utility supplies. It is not adequate for the utility to perform audits of furnaces using other fuels only when the customer takes the initiative to ask for one. Furnace efficiency modifications are very important conservation measures in any home, and DOE wishes to assure that as many customers as possible are aware of their benefits.

11. *Audit Calculation Procedures.* The Proposed Rule required that an audit of an oil furnace must include a steady-state efficiency test. The Final Rule has been changed in this regard. Section 307(b)(7) requires the auditor to estimate the seasonal efficiency of any gas or oil furnace. This seasonal efficiency must be based on an assessment of the steady-state efficiency, corrected for cycling losses. The steady-state efficiency can be estimated either from an actual test of the furnace, or from manufacturers design data for the furnace being inspected. Because we have added furnace tune-ups to the list of energy-conserving practices, the estimate of furnace efficiency is to assume that the furnace has been tuned. These changes have been made because estimates of energy savings for most of the program measures must include an assumption about furnace efficiency over the entire heating season. This is true whether the furnace is gas or oil. DOE believes that, though gas furnaces typically operate close to design efficiency on a steady-state basis, correction for cycling losses will affect savings estimates significantly. These corrections may be derived from any standard source, such as the ASHRAE *Handbook.* The requirement for a steady-state efficiency test for all furnaces has been reduced, since further analysis has led DOE to conclude that such tests might significantly lengthen many audits.

Several commenters were concerned with the difficulty of obtaining accurate audit results, questioning the adequacy of existing calculation procedures. One commenter, for example, stated that even the best state-of-the-art methods for calculating heat loss can only predict the actual energy consumption of a house to plus or minus 40%. A solar group complained that the cost effectiveness of many conservation measures were based on ASHRAE computations which have been found to be in error. There were several requests from States for financial and technical assistance in determining the adequacy of audit procedures. The Federal Trade Commission was concerned that the consumer should not be told that the audit has been "tested by the State" (as the Proposed Rule required) if this testing was either inadequate or unlikely to occur. Several organizations sent in or recommended sample audit calculations or procedures of their own.

Finally, some commenters wanted a clarification of the requirement to use local prices and climate data in calculating results, or information on where to obtain such data.

DOE has found substantial differences of opinion among those most experienced in this field about how to predict accurately the costs and savings resulting from installation of

conservation and renewable resource measures. This disagreement is particularly prevalent with respect to an audit which is to be performed in a relatively short time such as two to two and one half hours. DOE therefore believes it is important to retain flexibility in the calculation procedures. However, in order to assure that all audit calculation procedures are reviewed for accuracy before they are implemented, the Final Rule requires a State to include in its State Plan procedures to assure the accuracy of the audit procedures. The State may assure the accuracy of its procedures in one of two ways: it may validate the audit procedures itself (directly or indirectly), or it may submit the procedures to DOE for validation. The State may submit its audit procedure to DOE for validation before submission of the State Plan or with the State Plan. If the State does not have DOE validate its audit calculation procedures, it must describe in detail the means by which it has had its procedures validated. In this respect, adoption of a generally accepted audit procedure, such as ASHRAE's or DOE's model audit procedures, would be sufficient. In other cases, detailed validation studies may need to be submitted. The State does not itself have to conduct the validation studies; they could be conducted by an independent laboratory, for instance, or, if adequate, by the firm marketing the audit procedure. Finally, the Rule does not require that there be but one audit procedure for the State. Different utilities may utilize different calculation procedures. Nevertheless, each will have to be validated in accordance with § 456.307(b)(6).

DOE is concerned about the procedures used to estimate savings for wind energy systems. The applicability tests discussed below will often eliminate the need to provide such estimates. However, when cost or savings estimates must be made, paragraph (c)(10) requires that they be based on a system which is sized to meet the electrical load of the house. For example a house with electric heating is likely to have a greater electricity reqirement than one with gas heating, and therefore a wind machine with a larger output would be appropriate. Appendix I was developed by taking this sizing into account in designating wind energy devices as program measures. Paragraph (c)(10) also requires that the savings be presented as a function of various average yearly wind speeds. DOE has found that wind speeds depend greatly on the characteristics of individual sites and cannot generally be accurately estimated only from local airport data. Since wind savings depend greatly on average wind speeds, DOE recommends to anyone considering purchasing a wind machine that data be collected at the site before purchase. Tables of savings can be prepared for all auditors in a particular service territory. We are also concerned that estimates of electricity savings for wind systems be based on actual performance data for wind systems, rather than on theoretical calculations of how a particular machine is expected to perform. DOE's revised proposed standard for wind devices, which will be issued shortly, will contain test procedures for wind devices. In reviewing audit calculation procedures for States, DOE will recommend that wind energy savings be based on test data from this test procedure or equivalent.

12. *An Applicability of Program Measures Test.* The Final Rule requires the auditor to assess the applicability of a Program measure as a first step in the audit. If the audit is not applicable, then the Final Rule provides that no cost and saving calculation need be made. This provision responds to the concerns of many commenters about the cost of auditing for many of the measures, particularly solar and wind devices, which may not be applicable in many homes even where they are Program measures. It also helps assure that when a customer's home is audited, the results do not show cost and savings estimates that are highly unattractive. Subparagraph 456.307(b)(2) establishes the applicability criteria. Some are generic to all measures. Most are specific to particular measures. For example, where wind energy is a Program measure and the auditor finds that a particular house is on a lot of less than ¾ acre, the auditor need not give any cost and savings estimates for wind. The reason for this provision is DOE's belief that safety concerns require that a wind tower be installed only where the lot is at least two tower heights plus two rotor radii wide (or about ¾ acre in area). Similarly, if the auditor finds a furnace which is brand new, he need not estimate costs and savings for replacing it, since it is highly unlikely that a replacement furnace would be cost-effective. For all measures, one test of applicability includes whether the measure is already present. The Rule thus clarifies, for example, that if a home has storm windows, the auditor need not provide cost and savings estimates for them. Finally, a State Plan may contain certain additional applicability criteria which expand or restrict the number of homes in which measures are analyzed. Such criteria are subject to review by the Assistant Secretary to assure that they are consistent with Program goals.

Also, the Proposed Rule contained a provision in the installation standards for installers to check for the presence of wall insulation and, if it was already present, not to install additional insulation. In light of comment and further analysis, DOE has decided that the responsibility for determining whether wall insulation is already present should rest with the auditor. Therefore, DOE has modified the Rule and has added an applicability test for wall insulation, that is, a check for the presence of wall insulation as part of the auditor's activities if wall insulation is a Program measure.

13. *Energy Conserving Practices.* The Final Rule has added requirements for the auditor to emphasize the effectiveness of the energy conserving practices. DOE has found that these practices can save 25% of the heating and cooling energy in homes where they apply. Each of them either has no cost or has a low cost which is returned in energy cost savings in less than one year. Generally these practices can be performed by the customer quickly and without special instruction. DOE therefore believes that by requiring the auditor to emphasize these practices where appropriate, energy savings will be substantial.

In addition, DOE encourages, but does not require, States to require or allow their auditors to offer to install or perform some of these practices during the audit. The auditor might turn down the water heater temperature, for example, or install a flow restricter on a faucet. It is obviously important that the customer approve these steps, but auditors who undertake these energy saving practices will make the house more efficient than when they arrived and will assure that every audit results in energy savings. DOE's recommended audit procedures, which are being developed as part of the technical assistance to States, will include offering to undertake the practices for the homeowner.

DOE also encourages utilities and States to offer to install water heater insulation and some caulking and weatherstripping during an audit. Although NECPA generally prohibits utilities from installing these measures and requires that the customer pay for any such installation, DOE may grant temporary or permanent exemptions from the installation prohibition, and temporary exemptions from the customer-payment requirement. DOE

encourages States and utilities to seek such exemptions for this purpose. Because contractors rarely install these measures, DOE does not believe such installations by the auditor would be anticompetitive.

14. *Other Auditing Issues.* The Final Rule requires that if the auditor has any financial interest in the sale of a product, then that auditor must disclose this interest to the customer during the audit.

This provision was also in the Proposed Rule. The Federal Trade Commission and some other commenters recommended that auditors not be allowed to have any interest in the sale of any products. However, DOE believes that both States and utilities have an interest in maintaining the integrity of their auditors and will control possible conflicts of interest. An absolute ban by DOE, moreover, could cause grave problems and greatly increase costs in areas where there is dearth of trained auditors with no conflicts.

The charge which the customer pays for an audit appears to be the single most important determinant of participation rates in existing audit programs. NECPA requires that the decision on customer charges be left entirely to State Public Utility Commissions and nonregulated utilities. DOE, however, strongly encourages that customer audit charges be kept to a minimum. DOE prefers the audit to be free of direct charge to the customer. DOE also prefers that the audit include installation of low cost devices by the auditor as described above. This approach should result in energy savings in virtually all homes audited regardless of the initial motivation of the customer.

DOE has written § 456.307 with this recommendation in mind. DOE's goal has been to set minimum criteria which will assure audit quality at a reasonable cost to the utility. DOE believes, based on analysis performed in the last year and on comments received during the comment period, that the criteria we have prescribed will allow a well-trained auditor in an active utility program to perform three audits per day. DOE has aimed for an audit which an auditor can perform in an average of two to two and one half hours on-site.

The Proposed Rule contained a requirement for providing general information concerning Federal tax credits for conservation and renewable resource measures. In the Final Rule, we have added an additional requirement that the audit results contain sample calculations of the effect of the tax benefit on the cost of installing an applicable program measure. Because the tax credit depends on the cost of the measure, which is already calculated in the audit, this additional calculation should not impose any burden. Moreover, such an example could be a dramatic illustration to the customer of his economic benefits in installing Program measures.

EPA commented that reductions in air infiltration might reduce indoor air quality, especially in homes with sources of pollutants such as gas space heaters. DOE will shortly issue a proposed amendment to this Final Rule to require auditors to provide information on ventilation to customers. This subject is discussed at length below in "XII. Environmental Impact Statement."

*H. Arranging Installation—§ 456.308*

Section 215(a) of NECPA requires utilities to include procedures for informing eligible customers of "the availability of arrangements described in Subsection (b)." Subsection (b) requires utilities to "arrange to have the suggested measures installed. . . ."

Section 456.308 of the Proposed Rule contained the requirement for utilities to arrange installation of suggested measures. In an effort to encourage flexibility in the development of State Plans, this section provided States the opportunity to develop and describe an arrangement service of their own choosing. Subsection (b) required, however, that the arrangement service must entail more than the distribution of a list of suppliers and contractors.

DOE received numerous comments from utilities, States, and contractors regarding arranging installation. Many of these comments addressed the possible increased liability exposure that arranging provides for the utility, the cost and appropriateness of utility involvement in arranging, and the potential for anticompetitive activity where utilities provide any service beyond list distribution.

Many suggested that limiting arranging to distribution of the State-prepared lists would help to minimize this exposure. It was further requested that an explicit waiver of liability for all Program activities appear in the Final Rule, the State Plan, the Program Announcement, or the lists.

Utilities testified that arranging activities beyond list distribution will be burdensome. Cases where materials are in short supply or contractors are unavailable were raised. The question was raised as to how much effort a utility must expend before its obligation to arrange is satisfied. It was suggested that arranging activities be limited to the arranger's heating customers to reduce the costs associated with arranging. Utilities testified that arranging activities are outside the utility's area of expertise, and that such activity is more appropriately performed by the customer. Utilities testified that the prohibitions relative to anticompetitive activity make it difficult to provide any service beyond list distribution.

Various proposals for a definition of the scope of arranging were made. In addition to the suggestion that arranging be limited to the distribution of State-prepared lists of installers, commenters suggested that arranging be defined as billing, distribution of estimate request forms, answering telephone inquiries, and offering to forward audit results to three contractors the customer had selected. There were also suggestions that the entire arranging service be defined by the States or DOE.

Particularly where the utility provides installation services, contractors felt that utility arranging allows a competitor to control the flow of business. Utilities were sensitive to this concern of contractors. Neither contractors nor utilities wanted the utility to select contractors for customers. Contractors felt that the prohibition concerning unfair discrimination among contractors may not adequately safeguard against such activity.

The liability issue is discussed in the Preamble pertaining to § 456.106.

DOE has identified in § 456.308(b)(1) a minimum arranging service that the utility must perform. The service includes the utility providing the customers a choice between a list of contractors who have agreed to perform the installation for the auditor's estimated cost, or utility assistance to the customer in obtaining installation bids. In identifying this service, DOE is not requiring utilities affirmatively to seek out contractors who will agree to install at the auditor's estimated costs, although they may do so if they wish. Moreover, States may establish such a requirement. Absent such affirmative action by a utility, however, the burden is on the contractors to come forward and offer their services to the utility. If no contractor were willing to agree to install a particular program measure at the auditor's estimated cost or none came forward, the utility's arranging service with respect to that measure would only consist of assistance in obtaining bids. The mere distribution of lists of contractors, which is specifically required by NECPA, cannot be considered an arranging service. To encourage flexibility in the development of State Plans, however, § 456.308(b)(2) allows for States to propose in their

State Plans an alternative arranging service that provides a similar level of service to the customer as that otherwise required in § 456.308(b)(1).

The statute does not provide DOE the flexibility to require that arranging activities be offered exclusively to heating customers. Similarly DOE cannot ignore the statutory requirement for a utility to provide an arranging service, in addition to distributing lists.

Prohibitions relating to anticompetitive activities contained in the Proposed Rule have been retained in the Final Rule. These prohibitions against unfair discrimination among customers, suppliers, and installers are judged to provide adequate safeguards against anticompetitive activity.

The provisions prohibiting unfair discrimination among contractors or measures remain in Final Rule. Thus, the list of contractors willing to install measures at the audit estimates must be developed in a fair, open, and non-discriminatory manner. Any contractor on the Master Record willing to install measures at the audit estimate price should be included. It is not unfair discrimination among contractors to exclude those not willing to make installations at the audit estimate, and it is not unfair discrimination among measures, if some measures have contractors willing to install at the audit estimate and others do not.

*I. Arranging Financing—§ 456.309*

Over 169 people or organizations addressed various aspects of § 456.309 (arranging financing).

Comments focused mainly on the scope of arranging, the possible increased liability exposure that arranging provides for the utility, suggestions for provisions that would satisfy the arranging requirement, and utility financing of measures.

At least 32 commenters, mostly utilities, requested that the function of arranging financing be satisfied by the distribution of a State-prepared list of lenders. Some pointed out that placing the utility between a lender and a loan recipient requires the utility to become familiar with areas outside its scope of expertise. Others mentioned the confidential nature of a financing transaction. Mentioned most often by utilities, however, were the lack of a need for such arranging services and the liability exposure they present to the utility.

DOE received a number of suggestions as to what services should suffice, if arranging financing required an activity in addition to the distribution of lists. One suggestion was the utility compiling and certifying the list. Another suggestion was for utility assistance in resolving the non-responsiveness of financers. At least three persons suggested the distribution of loan applications. Forwarding a customer's name to three lenders was also proposed, as was a telephone inquiry response service. At least four comments proposed the distribution of printed information on shopping for loans as an adequate service. Dispute mediation was also offered. A number agreed that a definition of arranging was best left to the State.

At least 26 comments addressed utility liability. Some merely expressed concern over the perceived liability exposure. Others requested a specific waiver of liability in the rules, in the State Plan, as a precondition to the arranging service, in the Program Announcement, and on the lists.

A number of witnesses expressed concern over the amount of effort a utility must expend in arranging a particular loan. Instances where the credit standing of applicants inhibits the granting of a loan were raised. Another factor identified as presenting difficulty was the possibile lack of availability of loan money in general. Also, some witnesses testified that some banks are uninterested in granting loans for smaller amounts. On the other hand, the Salt River Project reported financial sector interest in smaller loans.

One utility suggested that there be a minimum amount that the customer must want to finance before any arranging activity takes place. The New York State Electric and Gas Corporation requested clarification concerning whether a financing organization would be permitted to investigate an applicant's credit rating.

There were several requests that the Rule allow States to make provision for low interest loans to low income customers. At least eight utilities expressed concern over a possible requirement that utilities function as a lender of last resort. Many utilities wanted to have no involvement at all with financing. Some States and utilities were very interested in encouraging utility involvement in financing. TVA attributed a good part of the success of its program to the facilitating aspects of financing.

At least four utilities requested that the Rule prohibit a utility from selecting a lender. Two objected to distributing lists containing interest rates, noting the rapid changes of these rates and the administrative costs of keeping such lists current.

The liability issue is addressed in the Preamble pertaining to § 456.106.

In consideration of the suggestions received for a definition of arranging financing, DOE feels that the variety of comments received supports its initial position to allow States to fashion arranging services suitable for their areas. To clarify its intention, however, that arranging financing must consist of some positive effort on the part of the utility or home heating supplier to assist its customer in obtaining financing, DOE has added an explanatory paragraph requiring that this effort be something beyond the distribution of lists, the provision of other required benefits, and information on shopping for loans.

DOE does not believe it was the intent of Congress to subject utilities or fuel suppliers to provisions in the Truth in Lending Act (15 U.S.C. 160, *et seq.*) to which they are not already subject. Neither does DOE believe that Congress intended to establish a Federal requirement that utilities and fuel suppliers be lenders of last resort.

DOE also intended that a utility's arranging activity would take place in a spirit of reasonableness. Should financing money or willing lenders not be available, for example, it would not be reasonable to expect the utility to make continuing efforts to arrange financing for a particular customer. DOE assumes that all arranging activity will take place in agreement with standard procedures in the financial community regarding credit. DOE encourages to the maximum extent possible the inclusion of low income consumers in the RCS Program, including the arranging of financing. This is further discussed later in conjuction with coordination.

*J. Accounting and Payment of Costs—§ 456.310*

Over 120 comments were received regarding accounting and payment of costs under the RCS Program. Over 70 of these were submitted by utilities. Over ten comments were received from State and local government agencies. About 20 responses were submitted by public interest groups. The remaining comments came from contractors, manufacturers, home heating oil suppliers and private citizens. Seven associations representing gas or electric utilities offered recommendations. Suggestions were also received from associations representing contractors and community action agencies.

Over 50 comments were received which stated a definite preference for the method of payment to be used for audit costs. Two-thirds of those commenting on this issue recommended that the cost of the audit be charged directly to the customer requesting it. The remaining third felt that audit costs

should be expensed to all ratepayers. The effects of different treatments of these costs on business competition, on low income customers, and on customer response to the RCS program were discussed.

Several commenters questioned how the decision on audit costs would be made, and whose responsibility it would be to make it. The Minnesota Energy Agency suggested that each regulatory authority hold hearings in which all covered utilities would participate, after which the regulatory authority's decision on charging of audit costs would include all the utilities uniformly. One electric utility recommended that the utilities themselves should decide how to bill for audit costs. Several commenters agreed that the decision should be made by the utility regulating body.

Utilities accounted for the majority of comments which requested that audit costs be charged directly to the customer. Several commenters specifically stated that customers requesting on-site audits should pay for them. Three utilities felt that renewable resource audits should be charged directly to the homeowner. Commenters reasoned that individual customers should pay for the services they receive, and that if the costs were expensed, some ratepayers would be forced to pay for services from which they would not benefit.

Several contractors and one public interest group felt that utility expensing of audits would be unwise as it would give utilities an unfair advantage over auditors in the private sector. Phrases such as "eliminates contractors from competing," "encourages utility monopoly of audit business," and "will negatively impact small businesses," were used.

An oil supplier felt that utility expensing of oil furnace audits would put oil dealers at a competitive disadvantage. A public interest group expressed its fear that utilities' offering of free audits will monopolize the field yet not strongly encourage conservation. It recommended that utilities be required to reimburse small businesses and community organizations who perform audits at the request of individuals who do not want the standard utility audit.

Over half of the comments which did recommend the expensing of audit costs were submitted by public or consumer interest groups. Several commenters wanted audits to be provided free or at the lowest possible cost. Many commenters were concerned that the RCS Program would not provide for the participation of low income homeowners. The South Carolina Association of Community Action Agencies stated that the involvement of low income customers is important because their homes are often the most energy inefficient. One State agency felt that expensing of audits would place an unfair burden on the low income ratepayer. Several public interest groups stated that charging the individual customer for the audit would severely restrict the participation of low income customers.

Another reason given for expensing of audit costs was its positive effect on encouraging participation in the RCS program. The Tennessee Valley Authority commented that if the audit was not expensed, customer participation may be low. A public interest group stated its belief that free or low cost audits would encourage greater response. Several estimates of RCS audit costs were provided. They ranged from a low $50–70 estimate offered by the American Public Power Association to a high estimate of $200.

The decision on how the cost of home energy audits is charged is reserved by NECPA to the State regulatory authority and to the nonregulated utilities. The Proposed and Final Rules reflect this legal requirement.

DOE is concerned about the effect of the impact of direct recipient payment for audits on the rate of customer response to the offer of an audit. DOE has been criticized by the Congressional Office of Technology Assessment, among others, for not setting higher objectives and energy savings goals for the RCS. Because the key decision of how the audits are paid for is not in its hands, DOE believes that it would be unrealistic to set goals which presume that audits will be free. On the other hand, DOE believes that the energy audit should be offered to customers at minimal or no cost to increase the response of consumers to the offer of an audit. DOE urges State regulatory authorities and nonregulated utilities to require that audit costs be largely or totally expensed.

Almost half of the comments which addressed duplication of audits endorsed § 456.310(c) of the Proposed rule. Several utilities strongly agreed that customers should only receive one free or subsidized audit. Two utilities said that customers should be limited to only one audit, regardless of payment method. An association representing gas utilities suggested that a customer requesting a second audit within a twelve-year period should be required to pay for it directly.

Several utilities discussed the need for coordination among utilities. It was suggested that the State Plans identify procedures for ensuring that audits are not duplicated. One electric utility said that the State should control audit requests and assignment to utilities, unless the utilities can form a cooperative organization to handle them.

NECPA requires each utility to offer and upon request to provide an audit to each of its eligible customers. Therefore, DOE believes that duplicate audits cannot be eliminated. DOE agrees, however, that no customer should obtain more than one subsidized audit. Again, the method of payment for audits is in the discretion of the State regulatory authority or the nonregulated utility.

Specific recommendations were received for alternate or additional accounts to be used in charging RCS costs. Four electric utilities suggested that Account 907, Supervision, be added in order to accurately reflect the supervisory expenses incurred in administering the program. A utility with a grandfathered financing program stated that using Account 124, Other Investments, instead of Account 908 would provide utilities the opportunity to earn a reasonable rate of return on loans made.

Several comments stressed the need for rapid recovery of costs. One gas utility felt that the Final Rule should establish minimum standards for cost recovery.

The Federal Energy Regulatory Commission is planning to publish revisions to the Uniform System of Accounts as prescribed in Title 18, CFR Parts 101, 104, 201, and 204. These revisions will establish separate accounts for the RCS Program. Prior to these revisions, utilities should use the accounts listed in the Proposed Rules, and the Final Rule reflects no changes in the designated accounts.

A few commenters recommended alternate methods for treating costs associated with the Program Announcement, the installation of Program measures, and the interest on utility loans. One electric utility objected to provisions that costs treated as a current expense shall be charged to all ratepayers. That utility felt that only residential ratepayers should be obligated to pay for RCS Program services.

A State agency urged that maximum flexibility be provided in the assigning of costs. Several utilities indicated that no mention should be made in the rules of the method to be used in handling costs of post-installation inspections and conciliation conferences. It was felt

that decisions on these Program elements should be left to the States.

The requirement that those costs treated as expenses in the RCS be charged to *all* ratepayers is contained in NECPA. Therefore, no change is made in this requirement in the Final Rule. DOE has clarified that the costs associated with billing of loans are included in the administrative and general expenses which can be expensed, upon approval of a State regulatory authority.

Although a number of commenters requested that DOE remove random post-installation inspections and conciliation conferences as allowable administrative expenses, DOE has retained this language. DOE's concern is that, if utilities are assigned any responsibility for either post-installation inspections or conciliation conferences, the utilities be able to recover the cost incurred. However, it should be made clear that DOE is not, by providing for these items, recommending or requiring that States assign any or all of the responsibilities for post-installation inspections or conciliation conferences to utilities. The State has complete flexibility to determine how and by whom the activities are carried out.

DOE agrees that costs incurred by a utility in carrying out its RCS responsibilities should recover its costs in a reasonable time. However, DOE does not believe it should establish specific requirements for the regulatory authorities.

The Department of Public Services, State of New York, requested that the requirements of § 456.310(b)(5) that allow interest on a loan made by a utility to be expensed only if the regulatory authority determines that such treatment will lower the rates for all ratepayers be broadened to allow interest to be expensed if permitted under an existing State law. The language of § 456.310(b)(5) comes directly from NECPA and only provides for the expensing of loan interest as a result of a determination by a State regulatory authority. However, DOE believes the New York Department of Public Service will find a remedy for its concern in § 456.506(b).

The following reasons were often cited for not requiring a single bill: (1) It would be very costly for many utilities to redesign existing accounting systems and computerized billing programs; (2) some State laws prohibit the inclusion of any other charges on utility bills; (3) customers may misinterpret the additional charges; and (4) it would increase the possibility of billing errors and hinder compliance with the dispute resolution procedure.

Many suggestions were made concerning formats and mailing procedures. The following billing methods were recommended to accommodate RCS charges and loan payments: (1) single-line billing on the utility bill; (2) loan billing on a separate sheet of paper (either in the same envelope with the utility bill or in a separate envelope); (3) inclusion of a bill prepared by the lending institution in the envelope with the utility bill; and (4) a coupon booklet for loan payments.

Many commenters indicated that a separate bill for loan payments sent at the same time each month would be preferable. The Pacific Power and Light Company stated that this method "eliminates the need to calculate the monthly interest charges to agree with the varying dates the periodic utility bill arrives." The Consolidated Edison Company of New York stated that "there is no inconvenience to a customer to receive a separate bill for a service which is totally separate and apart from his utility service." Several utilities also noted that this billing method would be easier to coordinate with existing installment payment plans.

DOE acknowledged, early in the public comment period, that providing of RCS charges or repayment of loans as part of the periodic bill for utility service (as required in NECPA, Section 215) would require adjustment to the utility's billing system and the format of bills. Consequently, DOE asked utilities which raised this concern in public hearings to provide supportable estimates of the costs associated with meeting this requirement. Although initially all of the utilities which were asked to provide this information agreed to do so, few utilities provided the Department such information. Most of the utilities which did provide estimates provided supporting data which allowed the Department to judge the potential burden of the requirement. Consequently, in the Final Rule, DOE allows RCS program charges and/or repayments for loans to be billed as a part of the periodic bill for utility service or on a bill separately rendered by the utility. However, each charge or loan repayment must be listed separately on the bill and the customer must be able to submit one payment which would cover RCS charges, loan payments and utility service.

The Proposed Rule indicated that payments received on utility bills which include RCS Program charges would first be charged to pay for utility service, with the excess credited to other charges unless the customer requested an alternative distribution of payments. Utilities asked that an alternative distribution not be allowed. One gas utility suggested that lenders could require a customer to request an alternative distribution of payments in order to insure that their loan is repaid. An electric and gas utility noted that separate billing for utility service and loan payments would eliminate the need to decide where partial payments should go.

The Final Rule retains the requirement that payments be credited first to utility service, unless the customer requests otherwise. DOE believes that it is reasonable for a customer to have the discretion to designate the distribution of payments to the utility between utility service and loan payments. If the customer submits less than full payment and chooses to designate that the loan payment be covered, he or she may, of course, jeopardize utility service. The "no cut off of utility service" provision is a prohibition in NECPA and cannot be changed, but does not apply if the customer's payments are inadequate even to cover the cost of utility service.

*K. Billing of Costs, Repayment of Loans and Termination of Service—§ 456.311*

Of the more than 140 comments received which addressed § 456.311 of the Proposed Rule, almost 100 were from utilities. The American Public Power Association and several other associations representing electric utilities, as well as the American Gas Association and the North Carolina Oil Jobber's Association offered recommendations. About 15 comments were received from State agencies and public utility commissions. A few responses were also received from contractors, manufacturers, public interest groups, and private citizens.

Over 85 of the 145 comments received addressed the subject of billing format.

Much confusion was expressed about the requirement in the Proposed Rule that RCS costs which are charged directly to a customer and included on the utility bill must be stated separately from the regular utility service charges. Commenters were concerned that the Final Rule might require all RCS charges and loan payment charges to be listed on the same bill.

Nearly every comment received on this topic urged that utilities be allowed the option of sending a separate bill listing RCS charges and loan payments.

Several utilities felt that a three-year repayment period for loans as provided in the Proposed Rule would be unreasonable in many cases. A number of recommendations were made concerning repayment of RCS loans. These included: (1) providing longer

repayment periods for larger loans; (2) establishing a minimum for RCS loans of $100; (3) requiring a minimum loan of $300 to qualify for a three-year repayment period; (4) limiting RCS loans to a maximum of $1,000 with a five-year repayment period; (5) allowing "equal payments" over a three-year repayment period; and (6) setting a minimum monthly payment.

The Puget Sound Power and Light Company asked whether a requirement for repaying a loan over three years would conflict with their grandfathered financing program which allows payment at the end of 10 years.

DOE believes it is reasonable for a utility to set a minimum repayment amount and the Final Rule contains a $5.00 minimum for the amount of monthly repayment. However minimum loan levels (e.g., $100 loan) have not been added and the three-year loan term has been retained because of NECPA requirements. The three-year repayment provision is a minimum and therefore may be exceeded. As a result, 10-year loans as cited by Puget Sound Power and Light would be permitted.

The Proposed Rule provided for the repayment through the utility bill of loans made by other lenders. Slightly over half of the respondents commenting on this issue stated that it would be acceptable for utilities and home heating suppliers to provide a billing service, but only under certain conditions.

The most frequently mentioned condition was that the utility be reimbursed for any costs incurred in bookkeeping, transmittal of payments, processing, collection and coordination. Two utilities merely stated that the regulations should provide for recovery of these costs. The utilities stated that they should be allowed to charge lenders a fee for handling loan payments. Three of these noted that it would be inappropriate for utility ratepayers to absorb administrative costs which would otherwise be borne by lenders.

Many commenters felt that the utility should only act as a billing agent with no responsibilities for collecting overdue loan payments and no increased liability exposure. Several felt that utilities, as well as lenders, should have the option of participating or not in such an arrangement.

One third of those commenting on this issue reacted negatively to the proposed requirement. Many comments were received which stated that the utility should not serve as a "collection agent for lending agencies", and that "all loan payments should be made directly to the lending institution."

Several commenters expressed doubt that many lenders would want utility billing and collection. They also felt that the additional cost and administrative burden imposed by this requirement may decrease the number of home heating suppliers willing to participate in the RCS Program.

This provision is required by NECPA and therefore is retained in the Final Rule. However, in response to comments received from utilities asking that they be permitted to expense billing costs, DOE has included billing costs as a part of administrative and general expenses. These expenses may be expensed or charged to the customer receiving the service at the discretion of the State regulatory authority or nonregulated utility. Further, because the Proposed Rule did not specifically address whether utilities could charge lenders a fee for providing a billing service, such an arrangement was not prohibited nor does the Final Rule prohibit such an arrangement.

The Proposed Rule provided a dispute resolution procedure for alleged billing errors. One State agency and one public utility commission expressed support for these procedures. The Federal Trade Commission strongly urged their retention. Two electric utilities felt that they were "inappropriate" and should be deleted. One of these felt that billing disputes concerning utility loans could be resolved through public utility commission procedures and that existing banking and consumer protection laws are adequate in cases involving loans made by financial institutions. Edison Electric Institute recommended that the regulations specify that normal procedures for resolving billing errors be used whenever possible. One utility stated that details of the procedures should be left to the States.

Several gas utilities stated that the responsibility for resolving disputes should clearly be that of the creditor, not the biller. One utility wanted the Rule to clearly indicate that billing dispute procedures apply only to repayment of loans and not to billing for actual energy usage.

The American Gas Association and four gas utilities recommended that procedural guarantees relating to billing dispute resolution be included on the initial bill only, rather than on each monthly bill.

Several utilities recommended reducing the notification period for billing disputes from 90 to 30 days. It was felt that a 90-day period would cause errors to compond and result in more time and money being spent to correct them. One electric utility recommended that a customer notify the lending institution as well as the utility. A public service commission felt that one initial contact, with the utility, is appropriate because the utility may also be the lender; this would provide for a consistent method of contact for all customers.

The billing error requirements contained in the Proposed Rule have been eliminated in the Final Rule. Those requirements, based on Regulation Z, are more appropriate to open-ended credit plans. Moreover, the conciliation conference procedures would be applicable to such disputes. Utilities have an interest in resolving their customers complaints with respect to billing and are likely to provide appropriate dispute resolution mechanisms. States, of course, could require specific mechanisms.

A number of comments were received which indicated concern about non-payment problems with RCS loans. Clarification was sought on the role of utilities in collecting overdue loan payments and in serving as lenders to customers whose service has been terminated.

The majority of the commenters responding to this issue agreed with an electric utility's statement that "the responsibility of the utility should be limited to handling the collection of current accounts only, with the lender being responsible for collection of any past due accounts," including the sending of overdue notices. Three electric utilities concurred with the Edison Electric Institute's position that "any deficiency in periodic payments," except in the case of billing error disputes, should "automatically terminate any agreement and/or further obligation on the part of a covered utility for future processing of loan payments." Collection of the arrears would become "the sole responsibility of the lending institution."

Several utilities sought clarification as to their responsibilities in the event of regular service termination. One pointed out that customer moves are a major source of bad debt losses and that it is not appropriate for a utility to be a lender for persons no longer receiving their service. The Tennessee Valley Public Power Association recommended that the utility be permitted to require acceleration of loan payments when customers terminate utility service. Another utility stated that if a customer's service is terminated for nonpayment of the utility bill, the utility should not be required to continue collection of loan payments.

A State agency and a utility supported the provision in the Proposed Rule

whereby a customer's utility service cannot be terminated as a consequence of default on loan payments. However, several other respondents expressed concern about the effects of this prohibition. A gas utility felt that without the possibility of service termination the customer would have no incentive to repay loans. A manufacturer stated that the prohibition would make the RCS loans less secure.

Although the utility billing requirements are drawn directly from NECPA, utilities do not have to provide a collection service for delinquent loans. The utility role is only that of billing agent. Nonpayment problems on loans may be returned to the lender for collection. Neither the Proposed Rule nor the Final Rule addresses the handling of the utility's responsibilities for loan collection in the event of service termination by the customer. State Plans may include such procedures.

*L. Listing—§ 456.312*

Over 125 comments concerned the listing of suppliers, contractors, and lenders.

The issues involved with listing are quite complex, requiring a balance among competition, consumer protection, program participation, and equity. DOE has closely examined the requirements in light of the many comments received and has determined that some changes may increase Program effectiveness. These changes have been incorporated in this Final Rule.

Approximately 40 comments addressed the possibility that excessive requirements would inhibit voluntary participation in the Program. Most people felt the excessive requirements would cause the best firms not to participate in the Program. One utility stated that there is not enough additional business available to an installer as a result of the RCS Program to cause the installer to submit to the requirements.

DOE is extremely interested in the active participation of contractors in the RCS Program. The principal factor causing commenters to feel that the listing requirements were excessive concerned the difficulty of complying with the materials and installation standards. The standards have been reconsidered, and as discussed in later sections of this Preamble, have been modified. DOE is confident that these standards reflect accepted good industry practice. It is anticipated that these standards will not impede voluntary participation by contractors.

Most commenters strongly objected to the requirement that the contractor send a copy of this contract to the utility that arranged installation. The commenters felt this was costly and unnecessary. The utilities were afraid that requiring contractors to submit all copies of contracts to covered utilities or home heating suppliers was an "invasion of privacy," and put them in a "jeopardous situation" subject to lawsuits from contractors and customers. One State agency stated that "this only encourages contractors not to want to be a part of the RCS Program." Several commenters suggested that the contracts be kept by the contractor and be made available to the State. One utility suggested that contractors notify the State of the measures installed, giving the name, address, and identifying list number for each customer.

The requirement that the contractor submit to the utility or home heating supplier a copy of all contracts for arranged installations has been removed from the rule.

Several people recommended adding additional criteria for being listed on the Master Record, such as requiring that listed firms be licensed and that installers be bonded and covered by insurance. The Insulation Contractors Association of America strongly urged bonding for installers to assure the purchaser adequate protection against incompetence and abuse.

Adequate bonding of contractors has been added as a listing requirement in the final rule. As described in § 456.312, the State may determine the level of bonding required. Section 456.312 provides for the State to add additional listing requirements appropriate in its State, if approved by DOE.

The American Bankers Association (ABA) commented that requiring rebating on the actuarial basis is unduly restrictive. ABA also claimed that lenders are unlikely to support the Program if additional disclosures are required, especially since duplicate statements are already issued by the Federal Reserve Bank. Some comments were received on securing loans with real estate property. Most of the commenters agreed that the customers should be made fully aware of the consequences if a secured loan is not repaid.

DOE agrees that requiring rebating on the actuarial basis is unduly restrictive and has removed this requirement. The disclosure requirement is retained. If such a disclosure is already being provided by a lender, the listing requirements create no need for an additional disclosure. DOE believes the disclosure is a necessary protection for borrowers.

The Proposed Rule stated that a Listing Agency will be responsible for the preparation of the Master Record. A majority of the commenters requested that this Listing Agency be a State agency. Most commenters felt that utilities or home heating suppliers would not be capable of listing all suppliers, contractors, and lenders. Commenters also thought a State agency would have better access to information concerning unreliable firms. Several respondents mentioned that the preparation would be costly and suggested the State receive funds if it was to be the Listing Agency. One State agency cited the inclusion of suppliers on the list as being particularly burdensome because every "hardware store, catalog supply house, and department store" in each State would have to be included. One solution to this, suggested in several comments, was that the yellow pages would be a better list and more cost-effective. A few State agencies preferred that utilities be the Listing Agency but under procedures set by the State. It was suggested that utilities connected with insulation companies not be allowed to participate in the preparation of the Master Record. One other suggestion was that an independent board of contractors should be the Listing Agency. Many commenters wanted telephone numbers on the lists in addition to names and addresses. Also suggested for inclusion were interest rates, loan fees, minimum financing terms, monthly payments, and alternative modes of financing.

Most comments recommended that the States should be responsible for updating the lists, but that DOE needed to set up a reporting system for updating the lists. Most respondents agreed that the update of lists needed to be more frequent than every six months. The respondents felt deletion and addition of names was very important, and therefore suggested updating the list monthly or even weekly.

Under the Proposed Rule, the States had the flexibility to designate any agency other than a regulated utility as the Listing Agency. The Final Rule is unchanged in this respect. DOE has amended the Rule, however, to permit the Listing Agency to assign duties to any entity, including utilities, to assist in the preparing of the Master Record in accordance with criteria and procedures established by the Governor or his designee. However, the Listing Agency may not assign duties to persons who compete with persons who may seek inclusion in the Master Record. The Governor or his designee must review the lists prepared by the Listing Agency,

if it is not a State agency, for conformance with his criteria and procedures. The ultimate responsibility for the Master Record remains with the Governor or his designee.

States may desire to include on their lists of suppliers, contractors, and lenders other information not specified in DOE's minimum requirements. There are numerous items of information that may be useful to consumers in their shopping decision. Section 456.312 specifies that any information the State does desire to include on its list must be described in the State Plan. In its review process, DOE will determine whether the items of information are unfair, deceptive, or anticompetitive or adverse to the RCS Program. Included in this determination will be a consideration of whether this information must be provided by suppliers, contractors, or lenders which want to be included on the lists and whether inclusion of such information would deter their participation. In addition, § 456.312(c)(2) specifies that a listing agency that allows one supplier or contractor to include information concerning types of measures to be included on the lists must allow information on all types of that measure.

The concern that lists be updated quickly has prompted DOE to alter the list updating requirement. The new requirement is contained in § 456.312(c)(5) which specifies that the utility must update its working lists every 30 days. This does not necessarily mean that a whole new list must be printed every 30 days. Addendum sheets may be provided instead.

The majority of respondents requested that a penalty period be imposed on delisted firms prior to relisting. Several commenters felt that delisting of firms should be done only by the Listing Agency. It was suggested that the Listing Agency should delist firms that have not filed contracts in a specified time period. Other commenters felt there should be mandatory delisting after two violations.

The Proposed Rule did not address the relisting of contractors who have been removed from the lists. As amended, § 456.312(a) (3) through (5) makes clear the State's prerogative to establish delisting procedures and to handle delisted contractors in a manner that it considers appropriate.

Most respondents strongly felt that utilities would be unfairly subject to lawsuits from contactors and customers. Most suggested that either a "waiver of liability" or a "hold harmless clause" should be included in the Final Rule. The utilities did not want the customer to have recourse to a utility for warranty of installation of a conservation measure unless the utility had installed the measure. Most commenters agreed that utilities should not be held responsible for the work performed by independent contractors or the financing acquired from lending institutions listed on the Master Record.

The issue of liability is discussed in § 456.106 of this Preamble. Further, the three-year warranty requirement has been clarified in the final rule to be a warranty of the manufacturer or the contractor.

*M. Postinstallation Inspections—§ 456.313*

Over 200 people chose to comment on postinstallation inspections.

Nearly one quarter of the commenters (44) specifically requested that the random inspection requirements be eliminated. Utilities, by far the largest group of respondents, made this recommendation most frequently; however, some State and local Government agencies also suggested this option. On the other hand, 28 commenters expressed support for the random inspections as well as the mandatory inspections as necessary to ensure the quality and safety of installation under RCS. The most common objections to the inspections were that they are not required by NECPA and are contrary to its intent, that they are too costly, and that adequate procedures already exist. However, over 100 commenters accepted some form of check on the quality of installation. Some utilities suggested that visual inspection by the customer should be adequate, while others recommended a mailed customer survey to determine customer satisfaction. A number of additional respondents did not specifically request elimination of this provision of the Rule but did indicate that existing procedures should be adequate.

Although recognizing that the post-installation requirement is a potentially costly provision of the Final Rule, DOE believes such inspections are necessary to ensure that installation standards and other listing requirements are being met. In the hearings in conjunction with the proposed rulemaking, DOE repeatedly inquired whether commenters felt that code inspections usually addressed insulation and other conservation measures. Commenters, for the most part, acknowledged that there was a need for such inspections and that existing building inspections did not address energy conservation measures in existing residences. The potential for faulty installations was discussed in the Preamble to the Proposed Rule as were the consequences related to improper installation, which included fire, structural damage, or reduced effectiveness of the measure. A further discussion of these concerns is presented in Part X of this Preamble where specific studies showing the amount of faulty installations found in several parts of the country are cited. DOE found no evidence in the comments to counter these concerns. Consequently, the requirement for post-installation inspections is retained in the Final Rule.

A number of commenters, including some of the same people who recommended eliminating the inspection, suggested that the State or local building code inspectors should perform the inspections if they are to be required by the Rule. In addition to the cost savings of this alternative, commenters pointed out that these inspectors would already be trained.

However, one State took a contrary position, pointing out that city and county inspectors experience frequent turnover and are trained only for safety inspections rather than for the safety and effectiveness inspection as required by the Program.

No group wanted to assume responsibility for the inspections. Utilities objected to the costs and manpower requirements. They also expressed concern about being exposed to increased liability and facing prolonged customer law suits. Those utilities who did not recommend local building code inspections generally suggested that the States or unspecified government agencies should be responsible. Some of the utilities who recommended State agencies stressed the importance of having the inspection completely independent of the audit procedure. Only a few of the States commented on this issue; those that did, however, usually wanted utilities or local government agencies to do the job.

States were particularly concerned about having adequate flexibility to develop procedures concerning post-installation inspections. Several States specifically requested that they be allowed to determine the nature and extent of the inspection. A few utilities made similar requests.

The Final Rule retains the requirement that the States provide procedures for post-installation inspections. As in the Proposed Rule, the State may determine which entity or entities will conduct the inspections. Although several utilities suggested that States be prohibited from assigning the post-installation inspection responsibilities to utilities, DOE believes this could unduly restrict the States's ability to develop an

adequate post-installation inspection program.

A number of the respondents were concerned about the nature and extent of the random inspections. There were a few general comments either supporting or opposing random inspections, or suggesting some limitations. However, most of the comments dealt with the percentage of the sample to be inspected. There was a wide range of numbers recommended. Among the most stringent was the Tennessee Valley Authority's recommendation of 100% inspection of all measures.

The most commonly recommended percentage was 5%. One utility recommended inspection of 5% of those installations which the customer cannot visually inspect himself. Several commenters suggested a reduction in the percentage required without specifying the amount. The only other percentage mentioned with any frequency was 10%. However, there were several variations on these numbers. It was commonly recommended that 100% of all complaints or customer requests received should be inspected. The Idaho Power Company recommended 100% inspection of installations during the first three months of the program and minimal inspections thereafter.

Several utilities objected to the 100% mandatory inspection of vent dampers, electric ignition systems, and wind energy systems as being unnecessary and costly. However, at least one State agency urged these inspections for safety reasons. The American Wind Energy Association urged inspection of 100% of wind system installations.

DOE has attempted in the Final Rule to reduce the coverage, the extent and, therefore, the costs associated with post-installation inspections consistent with the need for quality control. In summary, the Final Rule requires:

1. 100 percent post-installation inspections of vent dampers, electric ignition systems and wind energy systems.

2. Random inspections of ceiling, wall and floor insulation; active domestic solar water heating systems and solar active heating systems. For these measures, four of the first ten installations by a contractor must be inspected. This requirement is measure-specific that is, if a particular contractor installs ceiling insulation, floor insulation and solar water heating systems, 4 of the first 10 of his installations of each measure must be inspected. Ten percent of all installations of these measures must be inspected, but the four-of-the-first-ten inspections may be counted toward the ten percent requirement.

3. All listed contractors who install measures for which there are installation standards would have to be inspected, on a random basis, at least once during the life of the RCS Program. If, in that inspection, violations of the listing requirements (e.g., standards) were found, an additional inspection of the contractor would be required.

Existing inspections required and carried out by a locality, State or utility, to the extent to which those inspections check conformance with installation standards covered by these inspection requirements, may suffice partially or fully to meet this requirement. The Final Rule, like the Proposed Rule, makes no requirement or suggestion as to what entity or entities should conduct these inspections. In addition, if States decide to offer, directly or indirectly, post-installation inspection service to any eligible customer who requests such an inspection, the inspections conducted in response to customer requests can be counted toward meeting the post-installation requirements in 456.313(b).

DOE retains the State's ability to reduce the required 10 percent of random inspections upon demonstration that the level of random inspections required by the Final Rule is no longer necessary.

Finally, it should be noted that post-installation inspections are required only with regard to those installations which occur in the circumstances described in the State Plan pursuant to Section 456.305. These circumstances necessarily include all "arranged" installations, but may include other situations at the State's discretion.

DOE believes that these reduced post-installation inspection requirements will ensure quality installations, while significantly reducing the costs of providing inspections.

*N. Qualification Procedures—§ 456.314*

Over 145 comments addressed the requirements for qualifications of auditors, installers, and inspectors. DOE has carefully considered the qualifications requirements for auditors, installers, and inspectors in light of the comments pertaining to qualification and other related sections.

Of the requirements contained in § 456.314, the one that generated the most comment was the requirement for auditors to be qualified in all the areas enumerated. As mentioned in conjunction with § 456.307, utilities are not interested in performing audits of homes heated by a fuel other than the one they distribute; likewise, they are not interested in training auditors to perform audits of furnaces fired by another fuel. In particular, the requirement that auditors know how to measure flue gas temperatures and how to calculate the steady state efficiency of oil fired furnaces was described as unnecessary. Several utilities mentioned the relative sparseness of oil heated buildings outside the Northeast as adequate reason not to require all auditors to be able to audit all types of furnaces. The New England Fuel Institute offered training to those wishing to become qualified in the area of oil furnace audits.

DOE is concerned that all eligible customers receive a complete audit of their residences upon request. Similarly, DOE is concerned that auditors possess the qualifications necessary to carry out the audit. However, it seems reasonable that some auditing functions that are requested only infrequently and that require specialized equipment and skill might best be handled by specialists, and the Final Rule reflects this. However, a utility receiving a request for an audit must have auditors available who can perform that audit. The utility is free to make any arrangements it chooses to assure that these auditors are available. For example, a utility may want to contract with an oil dealer to provide its oil furnace audits.

One utility objected to the requirement that the auditor be familiar with the installation standards for program measures. Another objected to a requirement that the auditor be familiar with the different types of program measures.

DOE feels that a general knowledge of the installation standards contained in the Final Rule is necessary for the auditor to be able to conduct the audit knowledgeably, as well as to be able to answer questions on do-it-yourself installation. A general knowledge of the different types of program measures and their relative advantages and disadvantages is necessary to explain the options available to a customer. A "general knowledge" does not in our view indicate the same high level of understanding that "familiarity" would mean.

Several commenters, including the Insulation Contractors Association of American, placed strong emphasis on stringent auditor qualifications, since the success of the program is intimately linked to a properly performed audit and the information conveyed to the customer.

The National Bureau of Standards suggested adding a requirement that auditors, installers, and inspectors be familiar with applicable Federal, State, and local laws, codes, and regulations governing energy conservation, building

construction, and life and safety safeguards in residential construction. Other commenters suggested that installers should be familiar with State and local building, mechanical, electrical, plumbing, gas and fire codes. An insulation contractor testified that it is "ridiculous" to require applicators to have extensive knowledge of building codes, mentioning that finding installers who can perform their jobs well without constant supervision is difficult. Union Electric suggested adding a requirement for personal integrity. Eugene Water and Electric argued that DOE should prescribe an auditor training curriculum. Rockwool Industries emphasized the importance of consistent methods of qualifying and certifying auditors throughout the country. The National Rural Electric Cooperative Association proposed that a qualification procedure be provided for auditors and installers.

At least three groups stated that the rules require too much technical expertise on the part of auditors. At least 10 commenters felt that the states should have more flexibility to develop qualification procedures. There was one request that utilities be permitted to provide in-house training without the requirement for certification by another party. Washington State Energy Office asked for clarification as to whether States must certify auditors.

Several commenters suggested requiring all auditors to be knowledgeable concerning solar design techniques. In the same vein a commenter suggested adding a requirement that the auditor be able to screen for a renewable resources audit. Several utilities commented that it will be difficult to find auditors who can perform the renewable resources audit.

DOE believes that, since the RCS Program is a State-administered Program, States must have maximum flexiblity to respond to State-specific circumstances. DOE therefore believes it is inappropriate to specify in any greater detail the qualifications requirements for auditors, installers, and inspectors. It should be noted, however, that nothing in these Rules removes the requirement for installations to be performed in conformance with applicable State and local laws, codes, and regulations. In addition, the listing requirement of Section 456.312(b) requires contractors to install particular measures in conformance with the Installation Standards in Subparts G and I and by extension this implies contractor familiarity with appropriate installation practices.

A number of people objected to requiring auditors to be familiar with energy issues. On the other hand, at least one witness advocated such familiarity.

Auditor familiarity with energy issues is desirable from the standpoint of the auditor motivating consumers to take action. However, such familiarity does not contribute to the accuracy and validity of the audit and has been eliminated as a Federal requirement. DOE strongly encourages that auditors possess such familiarity.

Commenters expressed some confusion regarding whether or not one auditor has to conduct an audit of energy conservation measures, oil furnaces and renewable resource measures.

DOE in the Final Rule requires only one audit. However, this audit could be performed by several auditors. The utility must ensure, however, that the homeowner requesting an audit receives an audit of all applicable measures. Audits of measures must be performed by auditors who are qualified to audit for the measure(s). For instance, if an electric utility is requested by an oil-heated customer to conduct an audit, an employee of the utility might perform the audit of energy conservation measures and, through contract, audit renewable resource measures and the oil-fired furnace.

*O. Complaints Processing Procedures—§ 456.315*

This section of the Proposed Rule defined the minimum content of State Plans for resolving complaints or allegations of injury which arise as a result of the Program. More than 50 people or organizations commented on this section. State agencies and utilities made nearly all the comments.

Over half of the commenters said that the Rule should allow existing State procedures to satisfy the consumer complaint requirements of NECPA. These commenters generally felt that States should have the flexibility to determine what types of procedures were adequate. It was suggested that a State's existing or proposed procedure should not be rejected by DOE simply because it failed to meet one of the criteria in the Rule.

Several utilities said that State agencies rather than utilities should handle tne consumer complaint procedures. A few States mentioned that they do not have adequate funds to carry out the complaint resolution procedures, particularly if they are to be free to the customer. A few commenters said that consumers should not have two separate opportunities to resolve complaints, and others said that consumers should be required to go through the informal complaint procedures before the redress procedures.

Many commenters emphasized that existing State procedures should be adequate to meet NECPA's requirements. Several pointed to Section 213(c) of NECPA to support their contention that the Governor should establish the redress procedures as he or she sees fit. Many States were concerned that their small claims courts would not meet the procedural criteria of the Proposed Rule, often because of dollar limitations on those courts' jurisdiction. At least two commenters asked that redress procedures be allowed to include informal rules of evidence.

The minimum requirements for consumer complaint procedures and redress procedures have been reduced in the Final Rule, although the basic requirements for two procedures is retained. NECPA clearly separates the two procedures: one is to be available for complaints against persons who install or sell measures under the Program; the other is for anyone alleging injury under the program, particularly contractors who feel they have been unfairly treated in the listing procedures.

Paragraph (a) of § 456.315 establishes the minimum requirements for resolving consumer complaints. DOE's intent is that this procedure should be informal. Therefore the language of this paragraph has been changed to allow the entire procedure to be conducted over the phone. States may choose to include meetings with the consumer, or inspections of the installed products, as part of the procedure, but this is not a requirement of the Rule. Though several commenters asked that existing State procedures suffice, DOE received no comment which suggested that our minimum criteria could eliminate any existing State consumer protection mechanisms. Existing procedures meeting the requirements of this Section need not be duplicated.

The Rule does not require that the complaint actually be resolved. Rather, it assures that the consumer has a free and easily accessible process through which a State-designated, impartial party will make a reasonable attempt to resolve the complaint.

DOE sees no reason to limit the State's flexibility by prohibiting the designation of utilities to perform this function, particularly if the State has no funds with which to perform this function. DOE intends that any utility which acts as conciliator not be held liable, by virtue of its role as conciliator, in any cause of action between the customer and the contractor, seller, or financial institution.

DOE believes that it is important to allow consumers to have access to the informal complaint resolution procedures, as well as the more formal redress procedures. Many legitimate consumer complaints will never be raised if only formal procedures are available. A successful complaint resolution procedure may prevent many complaints from reaching the more costly redress procedure stage. The Federal Trade Commission, with whom DOE was directed by NECPA to consult, strongly endorses these provisions of our Rule as necessary to assure consumer confidence in the services offered through the RCS. States may add other persons besides consumers to those eligible for these informal procedures.

Paragraph (b) of § 456.315 has been modified to accommodate most, if not all, existing State procedures to provide redress for persons alleging injury under the program. NECPA clearly states in Section 213(c) that this procedure is to be available to any person alleging any injury, including consumers, contractors, lenders, and any others. DOE will approve any procedure which meets the ten criteria in Paragraph (b) of § 456.315. In addition, DOE will approve substantially equivalent existing procedures which the State demonstrates meets most of these criteria and which would be costly or difficult to amend.

Paragraph (c) of § 456.315 has not been changed.

*P. Coordination—§ 456.316*

This section defined the minimum content of the State Plan with regard to coordination of the RCS Program with other conservation programs, among energy suppliers, and with the State Regulatory Authority. Sixteen people or organizations commented on this section.

The Government of the District of Columbia commented that mere coordination of programs was insufficient—that integration of the various conservation programs would provide the most effective use of program funds. The Penquis Community Action Program commented that the coordination of the RCS Program with ongoing programs is not well outlined, and recommended mandatory coordination with community action programs.

The American Gas Association (AGA) and others testified that the program coordination requirement should not be interpreted to require utility involvement in administration of local, State, and Federal energy conservation programs. In addition, AGA suggested limiting program coordination to those programs affecting the same class of customers as the RCS Program.

The Ohio Department of Energy testified that the State's responsibility to assure fair prices and interest rates and identical audit results necessarily implies that a coordinated pricing mechanism is inevitable.

DOE supports any effort on the part of the States to coordinate the various energy conservation programs so their total effectiveness is enhanced.

DOE mandates that conservation programs under the purview of the Department are coordinated. This is necessary to assure adequate implementation of the RCS Program as well as DOE's other programs. It is DOE's position, however, that States can best determine the other programs in their States that should be coordinated and how coordination is best accomplished, and declines to further specify the State's activity.

The State may determine that coordination among energy suppliers will increase the efficiency of the administration of the RCS Program. DOE believes that it is possible to have a coordination effort that does not result in price collusion. Paragraph (b) of the Proposed Rule was included to underscore DOE's concern that, should the State decide to allow or require supplier coordination, the State must also specify the procedures for coordination that will prevent price collusion. This paragraph is retained in the Final Rule.

*Q. Home Heating Suppliers—§ 456.317*

This section defines the minimum requirements for home heating supplier participation in the RCS Program. Sixteen comments addressed this section.

Representatives of the home heating supplier industry desired liberal requirements for home heating supplier participation. For example, there were requests that home heating suppliers be allowed to provide audits of furnaces only. There were also requests that the Governor be required to specify in the Plan the requirements that would be applicable to home heating suppliers, rather than the requirements that would be waived. The industry also requests that the Governor's waiver in consideration of the resources of small home heating suppliers be liberal and apply to classes of home heating suppliers rather than on a company by company basis. The Denver Office of Energy Conservation requested more flexibility to expand the waiver.

The Public Utility Commissioner of Oregon encouraged the participation of home heating suppliers. A number of utilities wished that the participation of home heating suppliers be mandatory and that the requirements be the same as those of the utility. The U.S. Fiber Corporation objected to the home heating supplier participation in the RCS Program, claiming that there is not adequate protection against unfair competition.

There was one request to treat home heating suppliers as contractors and have them listed and delisted as they requested or problems developed. The Maryland Energy Policy Office expressed concern that the complexity of the Program requirements may inhibit home heating supplier participation. The Insulation Contractors Association requested the same opportunity to perform audits as the home heating suppliers were provided by the Proposed Rule.

The statute specifies that home heating supplier participation in the State Plan is at the option of the Governor. Should the Governor choose to include home heating suppliers in the Plan, the Governor must take their resources into consideration. The requirements specified in § 456.317(c) of the Final Rule may not be waived. These specific requirements are necessary even with respect to home heating suppliers to assure fair competition and integrity in the services provided. However, the Governor may waive any other requirements on a company-by-company basis or generically. For example, the Governor could decide to waive the requirement of a Program Announcement for all home heating suppliers in the State below a certain business volume.

DOE feels that the prohibitions concerning anticompetitive activities and unfair discrimination specified in § 456.317(c)(7), which may not be waived, provide adequate safeguards to prevent such activities.

NECPA provides for audits only by utilities and home heating suppliers. Installation contractors, however, are not prohibited from offering an auditing service to utilities and home heating suppliers on a contract basis. They would, of course, have to comply with the requirement detailed in § 456.307 regarding a disclosure of conflict of interest, as well as all the other requirements governing audits and auditors.

*R. Reporting and Recordkeeping—§ 456.318*

The majority of the comments received on reporting and recordkeeping stated that the proposed requirements were burdensome and duplicative. A

few comments suggested that the requirements should be tied more closely to the evaluation plan for the Program and that a sample set of data would be more appropriate than requiring a detailed report from each State. Several commenters recommended that the reporting requirements should be linked to some measure of Program success, such as energy savings, although several others specifically asked that DOE not require a measure of energy savings.

DOE has reviewed the proposed reporting requirements to determine if simple and less burdensome requirements could be established. The annual report is intended to tell DOE whether a State and its covered utilities and participating home heating suppliers are adequately implementing the approved State Plan. It will also provide information on the volume of activity generated as a result of the Program and will give an indication of the burden the Program imposes on the organizations administering it. DOE will use other mechanisms, such as surveys of sample utilities and/or case studies, to collect data for future Program evaluations. After considerable discussion, DOE concluded it would not be efficacious to establish a reporting requirement based on a goal such as energy savings.

DOE does not believe that the required information will be difficult or onerous to collect. DOE believes that utilities and States will probably keep many of these records for internal budgeting and accounting purposes without further incentive. However, DOE will allow States to propose in their State Plans a reduced level of reporting and recordkeeping for those items which the organizations would not otherwise track on their own initiative. Such a proposal will be subject to DOE approval.

A number of commenters recommended that specific items be removed from the reporting requirements, because they either duplicated information available from other sources or contributed little meaningful data. Some requirements were eliminated from the list in response to such comments. DOE chose not to drop other items, because DOE believes such information is necessary for DOE to determine whether the State Plan or Nonregulated Utility Plan is being adequately implemented. As noted above, DOE will consider waiving particular requirements where meeting them would pose particular burdens.

A number of commenters observed that a utility may have difficulty determining the number of installations or loans it has arranged, particularly in cases where a homeowner postpones taking an action. DOE believes that the revised definition of arranging may alleviate this problem.

The record reflected some confusion regarding the responsibility for reporting various items. Basically, the State is responsible for preparing and submitting the annual report. The State may require utilities to supply data for this report.

Several commenters noted that the proposed recordkeeping requirements may present some privacy or confidentiality issues should the data ever be used. At the time the DOE requests such data from a State, appropriate actions will be taken to protect the privacy of the Program participants.

One commenter requested that the audit records should be retained for only three years rather than five as proposed. The five-year retention is required by NECPA, so DOE does not have the option to reduce it.

Several utilities commented that the requirement to keep customer usage data for two years was not feasible and was inconsistent with the current practice of 15-month retention. It is DOE's understanding that the Federal Energy Regulatory Commission (FERC) requires utilities to maintain customer records for two years on microfilm. DOE is willing to accept microfilmed records on the RCS Program, so the two-year storage requirement should impose no additional burden on the covered utilities. In addition, DOE anticipates that it will assume some of the costs for information retrieval when Program evaluation begins. The State may develop alternative approaches for participating home heating suppliers.

These reporting and recordkeeping requirements have been submitted to the Executive Office of Management and Budget for clearance under the Federal Reports Act. This clearance will be obtained before any reports or records are required under this Section.

*S. State Measures—§ 456.319*

A large number of commenters requested that more flexibility be allowed for States to add measures to the various parts of the Program. Commenters were especially concerned that States and/or utilities be allowed to add measures to the program announcement and the audit. The prohibition in the proposed Rule on auditors giving costs and savings estimates of any measure which was not a "suggested measure" was particularly bothersome to many commenters.

Section 210(16) of NECPA requires the Secretary to designate "suggested" measures by rule. DOE has designated one additional measure, replacement air-conditioners, in the Final Rule (see "II.B. Definitions," above). DOE will consider designating further measures by rule in the future, but does not intend to do so until an appropriate time after the start of the program.

There are many additional measures which various commenters proposed which DOE did not consider appropriate for inclusion as part of the minimum national program requirements. DOE encourages innovation beyond the minimum requirements, however, so that States may design programs to suit local conditions. DOE has therefore established Section 456.319 as a mechanism by which States may propose additional measures which may be associated with the RCS program. DOE will review these proposed measures and may allow them if they do not adversely affect the program. The criteria for this review are contained in § 456.319 and are discussed here.

Subsection (a) allows the State to propose State measures in the State Plan for approval by the Assistant Secretary.

Subsection (b) establishes the criteria which the Assistant Secretary will use in reviewing State measures. Since only "program measures," as listed in Appendix I, are required to be included in the RCS program, paragraphs (b) (1) and (2) allow a State Plan to offer in conjunction with the RCS Program other measures which are "energy conservation measures" or "renewable resource measures," as defined in § 456.105. For example, in South Carolina, neither storm doors nor active solar heating systems are program measures. The South Carolina State Plan could offer these measures in conjunction with the program as State measures, for approval by the Assistant Secretary. The review of these measures will be limited to determining that they are in fact energy conservation of renewable resource measures as defined in the Final Rule.

Paragraph (b)(3) establishes the criteria for other measures which State Plans may propose as State measures. The first criterion is that the measure must save energy in one of the following three ways. It may either (a) reduce oil consumption; (b) reduce the sum of oil and gas consumption; or (c) reduce the sum of nonrenewable energy consumption. In addition, the measures must not increase the consumption of oil.

This criterion allows a very broad range of measures to be proposed. For example: (a) installation of wood stoves reduce the consumption of nonrenewable energy sources; (b) conversions from gas heat with central

air-conditioning to a heat pump (where electricity is generated with coal) would reduce the sum of oil and gas consumption; (c) conversions from oil heat to gas heat reduce oil consumption; and (d) installation of solar heating devices not already included in the program save nonrenewable energy sources. Conversions from gas to oil heat are precluded because increases in oil consumption are counter to national energy policy to reduce consumption of oil, especially imported oil. Similarly, conversions from oil or gas heat to electric heat pumps which would result in a net increase in oil consumption (because of oil use at the power plant) are also precluded.

The second criterion, stated in paragraph (b)(3)(ii) is that the State plan must contain an adequate method of assuring safe installation and use of the measure. This means that if the measure might cause a health or safety hazard if it were improperly manufactured or installed, then an adequate method for ensuring safety must be included in the State Plan. This might be satisfied by existing building code standards, but it also might require specific material or installation standards. Also, there may be a need for either random or mandatory post-installation inspections of State measures whose installation is arranged in conjunction with the Program.

The third criterion is that the proposed State measure not adversely affect competition or the RCS program. In particular the measure may not increase the cost to the eligible customer of a program audit under the program. That is, if the State measure is included in the audit and therefore increases the cost of performing the audit, this increase must not be passed on the customer directly. This criterion is analogous to the requirement in NECPA that in "suggesting measures" for inclusion in the program, the Assistant Secretary must consider the effect of added measures on the audit cost and thus on program participation rates (NECPA, Section 210(16)).

Finally, the fourth criterion is that an adequate analysis of the environmental effects of including the measure must be prepared by the State. DOE is particularly concerned that the environmental effects of wood stoves and fuel conversions be analyzed. States wishing to include any additional measures must take into account the environmental effects of such measures.

Subsections (c) through (g) require the State Plan to describe how the State measures will be associated with the RCS program. These subsections provide wide latitude to the State in deciding what services to provide for State measures. These services include inclusion in the Program Announcement, calculation of cost and savings as part of the audit procedures, provision of lists, arrangements for installation and financing, and each of the services of § 456.305.

DOE is concerned that customers will be confused if the services and benefits of State measures are different from those provided for program measures. Therefore, paragraphs (e), (f), and (g) of this section prescribe certain minimum conditions for inclusion of State measures.

Paragraph (e) requires that if a State decides to require covered utilities and participating home heating suppliers to arrange installation or financing of a State measure, then all the benefits of section 456.305 must be available to the customer as they would for a program measure. Also, the arranging services for State measures must be the same as those for program measures.

Paragraph (f) requires that if a State provides lists of contractors, suppliers, or lenders for State measures (or includes them on the lists with those for program measures), then the lists must be developed and distributed according to the requirements of § 456.312.

Section (g) requires that at any time that a State measure is associated with the Program measures in the RCS program and there are any differences in the services and benefits of the measures, these differences must be clearly explained. Similar requirements appear in Section 456.306 and 456.307.

DOE emphasizes that if a State chooses to associate a State measure with the RCS program and provide the same services and benefits as for program measures, then the customer need not be told that there are any differences and State and Program measures may be treated identically. DOE encourages States to provide the same services and benefits for State measures as for program measures.

### V. Subpart D—Nonregulated Utility Plans

Most of the comments on Subpart D related to subjecting or excluding nonregulated utilities from the provisions for covered utilities that are subject to a State Plan. For example, the North Carolina Utilities Commission argued that nonregulated utilities not included in a State Plan should be required to meet the same provisions as covered regulated utilities in the State. On the other hand, the Salt River Project argued that the exclusions provided to nonregulated utilities not included in State Plans should be provided to the nonregulated utilities even when they are included in State Plans.

Commenters were also divided on their recommendations concerning the nonregulated utility's use of State services, such as listing, when the nonregulated utility is not included in the State Plan. The Missouri Public Service Commission argued that if a nonregulated utility uses the State Master Record, it should be required to conform to the remainder of the State Plan. Los Angeles Department of Water and Power, on the other hand, argued that the nonregulated utility should be permitted to incorporate any part of the State Plan in its own plan.

DOE believes that the exclusions for nonregulated utilities, particularly coupled with the additional requirements for coordination with the State Plan, are reasonable, because the the nonregulated utility which submits its own Plan is unique. Since the State chose not to include the nonregulated utility in its plan, the nonregulated utility should not be forced into strict compliance with the State Plan, but rather be accorded the flexibility given any agency developing a Plan under these rules.

DOE agrees that, upon mutual agreement between the State and the nonregulated utility, a nonregulated utility should be able to utilize any of the services which the State provides under the RCS Program. The Final Rule reflects this approach.

### VI. Subpart E—Supply, Installation and Financing by Utilities

Commenters expressed concern over whether the prohibition against utility financing covered the leasing of energy conservation and renewable resource measures which they believe would increase the use of solar energy; if States could require utilities to finance small ($300 or less) loans; if particular State laws or existing or planned utility programs qualify for the exceptions; and how the prohibitions and exceptions would apply. DOE was urged to adopt a liberal waiver policy for financing. Finally, several commenters recommended that DOE adopt a more informal approach for the review of exceptions to the prohibitions and asked that the Assistant Secretary rather than the Office of Hearings and Appeals determine exceptions to the prohibitions.

The prohibition on supply and installation includes the leasing of energy conservation or renewable resource measures. NECPA does not empower DOE or the States to require utilities to make small ($300 or less) loans for financing energy conservation

or resource measures. Rather, NECPA and the Final Rule *allow* utilities to make small loans. States, under their own authority could, of course, require such financing.

Utilities wishing to seek exceptions to the prohibitions should apply in accordance with the procedures in Subpart E. These procedures have been modified so that exception requests are submitted to the Assistant Secretary rather than to the Office of Hearings and Appeals. Requests for exception made as a comment on the Proposed Rule will not be considered.

DOE has clarified the Final Rule language to indicate that the prohibitions apply to holding companies of utilities, parent companies of utilities, and subsidiaries of utilities. The exceptions and waivers will only apply to the particular parent company, or particular subsidiary for which the exception or waiver is granted, or for which the terms of the State and local law exception are met.

DOE encourages requests for waivers of the prohibition against utility financing. The lack of ability to obtain reasonable, long-term financing is seen by DOE as a potential barrier to residential customer conservation. Moreover, commenters from the banking community did not suggest that utility financing would be anticompetitive.

**VII. Subpart F—Federal Standby Authority and Enforcement Provisions**

Few comments were submitted on Subpart F regarding Federal Standby Authority. Most comments concerned the method and timing of Federal Standby Authority. The timing of the authority and the method by which it would be invoked are drawn directly from the National Energy Conservation Policy Act and are substantially identical to its requirements.

Although DOE has made no changes to Subpart F of the Proposed Rule and the language and requirements of this Subpart are identical in the Final Rule, DOE wishes to clarify in response to questions on this matter that, where Standby Authority is invoked due to inadequate implementation of a State Plan, the Department is under no obligation to follow the State Plan and may promulgate its own Plan for utilities to follow.

**VIII. Subpart G—Renewable Resource Material and Installation Standards**

*A. Solar Domestic Hot Water and Active Solar Space Heating Systems*

In the Proposed Rules, DOE proposed the application of the HUD Intermediate Minimum Property Standards (MPS) to assure the adequacy of the installation and performance of solar domestic hot water and active solar space heating systems. Several comments were received suggesting the use of standards other than these. DOE has reviewed these proposals and has concluded that some recommendations concerned standards not yet recognized as voluntary consensus standards, and other recommendations suggested use of standards not as comprehensive or commonly utilized as the HUD MPS. DOE did specifically consider the potential for further assurance of proper installation through requiring compliance with the recently published *HUD Manual of Accepted Practices* (a companion to the HUD MPS Solar Supplements). Inasmuch as this document is primarily concerned with interpretation of the requirements of the MPS, DOE remains confident that requiring compliance with the basic standard is adequate for the purpose of this Program.

The HUD MPS identifies where poor practices have created problems. It specifies installation procedures designed to avoid typical problems, and deals specifically with problems of toxic materials in terms of practices designed to alleviate such problems. Moreover, the HUD standard spells out test procedures for materials and components. DOE continues to believe that the protection provided by adherence to the HUD standards is necessary to assure safety and effectiveness of solar systems installed within this Program.

The *HUD Manual of Accepted Practices* will be provided (as technical assistance) to interested States and utilities for their consideration as means for training auditors or inspectors, and ensuring compliance with the provisions of the MPS standards.

*B. Passive Solar Space Heating and Cooling Systems*

In the Proposed Rules, DOE reserved the section on standards for Passive Solar Space Heating and Cooling Systems, pending the outcome of further investigation concerning the need for such standards to assure the safety and effectiveness of such passive solar systems installed within this Program. DOE specifically solicited comments on this subject.

A portion of DOE's uncertainty as to the need for passive standards had related to the proposed inclusion of "thermal pond systems" as a suggested passive measure. The effect of large volumes of water (i.e., weight) upon existing residential roof structures had caused DOE to consider the need for installation standards for these devices. As discussed elsewhere in this Preamble, these devices have been removed from the list of passive measures. This action eliminates DOE's immediate concern for the need for specific RCS standards for the passive solar measures.

In addition to the above discussion, several comments were received suggesting the nature of standards which would be appropriate. Other commenters concurred with the DOE opinion presented in the Preamble to the Proposed Rules that standards for such passive solar systems at this time could seriously inhibit the growth of this industry as well as potentially increase costs unnecessarily. No substantial information was offered to indicate that such passive solar systems present threats to safety or require standards for effective operation. DOE therefore concludes that local codes and national standards provide sufficient protection to the consumer for the performance and safety of passive solar space heating and cooling systems installed under this Program.

*C. Small Wind Energy Systems*

Partly as a result of comments and partly as a result of its own concern, DOE has prepared substantially revised standards for small wind energy systems. This standard is being proposed as a part of the Proposed Rule to be issued shortly.

**IX. Subpart H Energy Conservation Materials Standards**

*A. Background*

NECPA requires the Secretary of Energy to promulgate Standards that he determines are necessary to assure the general safety and effectiveness of materials and products designated in NECPA as residential conservation measures. The Energy Conservation Materials Standards in Subpart H of the Final Rule for the RCS Program were based on: (a) existing consensus and Federal standards, (b) Consumer Product Safety Commission: Interim Safety Standard for Cellulose Insulation, 16 CFR Part 1209, (c) CPSC 16 CFR Part 1404 Cellulose Insulation Labelling Requirement, and (d) various industry-DOE and interagency task forces recommendations. Where required, input from current research programs and field studies sponsored by DOE, other Federal agencies, and industry were utilized to provide a sound technical basis for revisions in these standards. The standards included here address only those material characteristics and test procedures

which DOE determined to be necessary to ensure the general safety and effectiveness of the material.

Considerable public comment was received on both general and specific aspects of the proposed standards. In general the comments supported the need for RCS material standards to provide a consistent set of requirements that could be utilized by producers, contractors, States, and utilities in implementing a safe and effective RCS Program. However, there was a concern that overly prescriptive standards could result in additional costs and could conflict with existing State and local codes. In response to these comments, DOE has attempted to rely whenever possible on existing laws and standards. Deviations from or modifications to these existing laws and standards are described below.

DOE determined a need for standards or performance criteria to ensure safety or effectiveness for the following RCS measures:

- All insulation materials
- Exterior, framed storm windows
- Storm and thermal doors
- Thermal windows
- Furnaces, boilers and heat pumps
- Replacement oil burners
- Vent dampers
- Intermittent ignition systems
- Caulking and sealants

In some instances, DOE determined that material standards were not necessary to ensure the safety or effectiveness of a particular measure. Clock thermostats and heat reflective and heat absorbing films are examples which are discussed below in greater detail. Unless DOE has specifically determined that a standard is necessary for a measure, it can be assumed that a product need only meet the appropriate definition contained in Section 456.105.

Included in the General Issues section of this Subpart and of the Preamble is a discussion of public comment received on the standards for all measures and DOE's response to these comments. Detailed comments which suggested additions, deletions, and revisions to specific proposed standards are discussed in the Specific Issues Section of this Subpart of the Preamble.

In addition to the public comment on the proposed standards, the Consumer Product Safety Commission (CPSC) Interim Safety Standard for Cellulose Insulation, 16 CFR Part 1209, CPSC Cellulose Insulation Labelling Requirement, 16 CFR Part 1404, and Federal Trade Commission (FTC) Trade Regulations: Labeling and Advertising of Home Insulation, 16 CFR Part 460, which were published subsequent to the RCS Proposed Rules, were reviewed to determine their effect on the RCS material standards. In those areas where these regulations are directly applicable, DOE does not address specific requirements. For instance, since FTC Part 460 addresses thermal resistivity of insulating materials, DOE does not require additional thermal resistivity provisions or reference FTC's since it is assumed that all manufacturers must meet these provisions regardless of their participation in the RCS program. In the same way, DOE does not require fire safety or corrosion requirements for cellulose insulation since all cellulose manufacturers are required to meet CPSC Part 1209. DOE has taken the same position with regard to the labeling requirements in FTC Part 460 and CPSC Part 1404.

*B. Insulation*

1. *The Need for Material Requirements.* Material standards are required for all thermal insulations in order to minimize potential problems which may arise from their use. Such problems can limit the effectiveness of an insulation or lead to safety or health hazards.

Some specific safety and effectiveness problems which could result from improperly manufactured material are:

(1) Fires resulting from combustible material.

(2) Corrosion of pipes, ducts or electrical components.

(3) Emission of toxic or noxious gases or odor.

(4) Support of fungal growth when moisture is present.

(5) Asbestos-related problems.

(6) Inaccurate determination of thermal performance.

Retrofitting residences by the addition of thermal insulation can increase the risk of fire if the insulation material is combustible. For insulation used in retrofitting, the fire-safety tests contained in some existing specifications are not adequate to determine the flame spread, smoldering ignition, or smoke and toxic combustion products which characterize the fire risk of these materials.

In the case of cellulosic insulation, the CPSC has issued Interim Safety Standards for Cellulose Insulation (16 CFR Part 1209), which establishes fire-resistance requirements based on two recently developed test-methods. The DOE has referenced the fire safety requirements in this CPSC standard for other insulating materials when laboratory test data indicated that these insulation materials posed similar fire risks.

The DOE standards contain requirements which limit corrosion of thermal insulations to assure that these materials do not cause corrosion of structural components such as truss plates, electrical wiring, or plumbing. Failure of any of these due to corrosion can be a serious hazard to occupants of the house. The CPSC has determined that cellulosic insulation can cause corrosion of these building components, and has included in their 1209 Rule provisions which measure and control corrosion characteristics. There is evidence that there may be similar problems with other insulating materials as well and DOE has addressed the issue in the appropriate insulation standard.

The installation of thermal insulation in areas of low ventilation (e.g., walls) can lead to the growth of fungi; fungal spores are a health hazard. Excessive moisture absorption in insulation, a condition which can accompany varying humidity, increases the potential for corrosion and fungal growth. It also decreases the thermal performance of insulation.

The effectiveness of thermal insulation is measured by its thermal resistance. The DOE Standards do not require thermal resistance testing since requirements are already included in the FTC Trade Regulation Rules on Labeling and Advertising of Home Insulation (16 CFR Part 460).

The thermal resistance of insulation depends on its installed density. For all loose-fill insulations, the density governs material coverage (i.e., number of bags required to cover a given wall or attic floor area to a desired level of thermal resistance). A density requirement is necessary to assure that the insulation, when installed at the thickness recommended by the manufacturer, actually delivers the thermal resistance advertised. The FTC in their 460 Rule addresses both thermal resistivity and density for all types of insulation. CPSC also addresses settled density requirements for cellulose in CPSC Part 1209. Again, DOE standards do not include requirements for either thermal resistivity or density since these are included in other regulations which insulation manufacturers must meet. In addition to marking and labeling provisions required by the FTC and CPSC rules, DOE has included minimum additional requirements relating to health or fire-safety aspects of the products.

In general, there are voluntary consensus standards, Federal specifications, and Federal regulations that address the above-listed material requirements for each of the thermal

insulating materials covered in the RCS Rule. The adequacy of these existing Standards for each material is addressed in this section. Whenever possible, DOE elected to merely reference provisions of established standards to avoid confusion and to ensure maximum consistency with requirements which manufacturers are already meeting.

2. *Cellulosic Insulation.* The standard for Cellulose contained in § 456.804 is based upon F.S. HH–I–515D.

DOE recognizes that the CPSC Interim Standard for Cellulose Insulation (CPSC Part 1209 adequately addresses the fire-safety and corrosiveness properties of cellulose, and that this Standard also contains a settled density test procedure. Therefore there was no need to address these properties in the cellulose standard in Section 456.803.

Although DOE is concerned abut the reproducibility of the CPSC corrosion test, it appears possible that CPSC may revise the test method to include a procedure for retesting.

DOE has included a requirement for vermin resistance since vermin can feed on the starch content of some cellulosic insulations unless the material is properly treated.

The DOE recognizes that the FTC Regulation on Labeling and Advertising of Home Insulation (FTC Part 460) is applicable to thermal resistance testing and labeling of cellulosic insulation. DOE therefore does not need to include requirements for thermal resistance testing.

The Federal Specification HH–I–515D contains material requirements and test methods for the following properties of cellulosic insulation: vermin resistance, moisture absorption, odor emission, fungi resistance, and coverage. However, this Federal Specification only applies to cellulosic insulation manufactured for government procurement, and is not a requirement which other manufacturers must meet. DOE has therefore referenced these requirements and appropriate test methods as requirements for the RCS Program.

Two minor deviations were made from HH–I–515D, however. The container size in the moisture absorption test was changed to make it compatible with containers used in other tests. Gypsum board was specified in the fungi resistance test because it provides more reproducible results and less opportunity for contamination of system components.

Since meeting this Specification has caused no significant hardships for the insulation industry, the DOE judged that inclusion of the appropriate sections in the DOE Standard will not impose a burden on the cellulose industry.

The only substantive addition to the Federal Specification is in the area of coverage. DOE recognizes that insulation cannot be blown both vertically and horizontally with the same density results. Therefore, DOE has added to the coverage chart a section on sidewalls in addition to attics. Manufacturers will be required to fill in R-value, minimum number of bags per 1000 sq. ft., maximum net sq. ft. coverage per bag, and minimum weight per net sq. ft. of installed insulation for three common stud space areas. DOE maintains that the addition of sidewalls to the coverage chart should add greatly to the ability of a contractor to provide proper cavity fill and ensure proper thermal performance.

DOE is aware of the need to develop a test to determine fire resistance permanency of cellulosic insulation. Little is known regarding how long the flame retardant chemicals continue to perform the function for which they were designed. Research continues in this area to develop a test which will accurately simulate the permanency of these chemicals.

3. *Mineral Fiber Loose-Fill.* The Standard for mineral fiber loose fill contained in Section 456.805 is based upon CPSC Parts 1209 and 1404, F.S. HH–I–1030 A, HH–I–515D, and ASTM C–519.

DOE recognizes that FTC Part 460 applies to thermal resistance and labeling.

The DOE Standard contains the same fire-safety requirements and tests as CPSC Part 1209 since these are also applicable to mineral fiber loose-fill insulation. The radiant panel and smoldering combustion test provide a much more thorough evaluation of the fire characteristics of the insulation than the flame spread test contained in F.S. HH–I–1030 A. Since binder content does affect smoldering and flammability of mineral fiber insulation, DOE determined it should be tested in accordance with the same procedures as required for cellulose.

Federal Specification HH–I–1030A contains requirements and test methods for the following properties of mineral fiber loose-fill: weight loss on ignition, corrosiveness, and coverage. The DOE Standard cites the appropriate sections of the Federal Specification with the addition of specific thicknesses for wall application on the coverage chart. Because fungi and odor can characterize mineral fiber with binder content, the DOE Standard also cites the applicable requirements of Federal Specification HH–I–515D.

A coverage chart is included similar to the one required for cellulose. Manufacturers will be required to include their recommended installed density for various thicknesses in both ceilings and sidewalls.

As with all standards included in §§ 456.803–456.809, FTC requirements for thermal resistivity and the CPSC and FTC requirements for labelling apply. Labelling provisions relating to clearances around heat sources are considered equally important for all types of insulation materials, since heat build-up caused by any insulation can be sufficient to generate ignition of structural members or electrical components.

A requirement for moisture absorption contained in the Proposed Rules was deleted in the Final Rules since DOE is not aware of any related problems with respect to mineral fiber.

4. *Mineral Fiber Batt and Blanket Insulation.* The standard for mineral fiber batt and blanket contained in Section 456.806 is based upon CPSC Parts 1209 and 1404, F.S. HH–I–1030A and HH–I–515D, and several ASTM test procedures.

The DOE recognizes that FTC Part 460 is applicable to thermal resistance testing and labeling of mineral fiber batts and blankets and that the same fire-safety requirements and tests included in CPSC Part 1209 are also applicable. Slight modifications have been made to the fire safety requirements so they apply to the batt material. For instance, the smoldering combustion test is modified to require the test to be performed on batt material at recovered thickness without a membrane covering. The radiant panel test will be performed with the vapor barrier membrane placed face down in the tray and vapor permeable membrane (if one exists) face up. This is specified to simulate correct installation procedures.

Federal Specification HH–I–521 E is referenced for its marking and fungi-resistance requirements for mineral fiber blankets and batts. Federal Specification HH–I–1030A is referenced for its requirements and tests for corrosiveness, and Federal Specification HH–I–515D is referenced for its requirements for odor-resistance. As with mineral fiber loose fill, requirements for moisture absorption were deleted from the Final Rule.

In addition, DOE has referenced ASTM E–96 as the requirement for vapor permeance. DOE determined it necessary to test the permeance of both the vapor resistant membrane and the vapor permeable membrane (if appropriate). If facings attached to the

insulation are to be used as vapor barriers, they must meet the definition in Section 456.903(b)(26) for vapor barriers. ASTM E–96 will insure this.

A requirement was also included in Section 456.805(b)(6) for dimensional tolerances. This was included to ensure consistency and quality control in the size of batts and blankets being manufactured. Deviation from standard sizes will result in lower thermal performance as heat escapes through gaps left between batts and the joist or stud spaces which they are meant to fill.

The same labeling requirements noted for loose fill insulation are applicable to batts and blankets. The only addition is a reference to flammable membrane coverings. The importance of this statement was emphasized by CPSC, although CPSC did not require it.

5. *Vermiculite Thermal Insulation.* The standard for vermiculite insulation contained in Section 456.807 is based upon CPSC Part 1404, F.S. HH–I–585C and HH–I–515D, and various ASTM procedures.

Again, DOE recognizes the applicability of FTC 460 to the thermal resistance testing and labeling of vermiculite.

Federal Specification HH–I–585C contains requirements and test procedures for combustibility and water repellancy which are referenced in Section 456.806. Since vermiculite does not generally contain the additives which encourage combustion in other loose fill materials, a much simpler combustibility test (contained in HH–I–585C) was determined appropriate. The ability of a material to repel water affects its thermal performance in some applications. In below-grade applications, for instance, considerable moisture is present. DOE has therefore referenced the procedure in HH–I–585C for determining water repellancy.

As with all other loose fill insulations, DOE has also included the coverage chart which includes recommended densities for both ceiling and wall applications.

In addition, DOE has specified ASTM requirements for density and grading. Grading was determined to be important since it affects the effectiveness of the material in the installed condition. Although the material is generally poured, grading requirements are particularly important if blowing is attempted. Minimum particle size must be large enough to prevent the material from entering the living space through penetrations in walls and ceilings.

Marking requirements for vermiculite are the same as those for other insulation materials.

6. *Perlite Thermal Insulation.* The standard for perlite insulation contained in Section 456.808 is based on CPSC 1404, F.S. HH–I–574B and HH–I–515D and various ASTM requirements.

Again, DOE recognizes the applicability of FTC 460 to thermal resistance testing and labeling of perlite.

Other physical characteristics of perlite to be tested are the same as those for vermiculite with corresponding procedures. The only addition is a requirement for a minimum amount of solvent solubles to be tested in accordance with HH–I–574B. This was included because perlite is a relatively absorbant material. If the material absorbed oil-based materials (perhaps as a result of careless handling), the combustibility of the material would increase.

7. *Polystyrene Insulation Board.* The standard for Polystyrene board contained in Section 456.809 is based on F.S. HH–I–524B, ASTM E–84, and ASTM C–578.

As with all insulation materials, the FTC 460 requirement for thermal resistivity and labeling is applicable. DOE determined that ASTM E–84 most appropriately addressed fire characteristics of polystyrene. Although F.S. HH–I–524B requires a flame spread of 25 or less, DOE only requires a flame spread of 75 or less. This is because a 15 minute thermal barrier is required when the material is installed on the interior of a residence. DOE considered inclusion of a smoldering combustion test, but determined that appropriate validation of the test procedure to the characteristics of polystyrene was necessary first. DOE will continue to examine this.

DOE has made an effort to eliminate distinctions between classes, types, and styles of insulating materials when they did not directly apply to applications within the RCS Program. The one exception is classes of polystyrene determined by water absorption when tested in accordance with applicable provisions of HH–I–524B. Since moisture reduces the thermal effectiveness of insulating materials and since moisture is particularly prevalent below grade, the installation practices require only application of Type 3 polystyrene rigid board to installations below grade.

Water vapor transmission should also meet the requirements of HH–I–524B. From an application perspective, it is especially important for contractors to have this information so they can install the product correctly. For instance, if a low permeability material is installed on the exterior of a house with additional insulation in the cavity, special precautions will have to be taken to ensure that moisture is not trapped within the wall cavity.

DOE determined the strength requirements included in HH–I–524B were necessary to ensure the effectiveness of the installed insulation. Minimum strength requirements are necessary to ensure that the material will be installed in the same condition in which it left the factory. Dimensional tolerances which conform to requirements of ASTM C–578 were included for the same reason that they were included in the mineral fiber batts and blanket standard.

Marking requirements for polystyrene are consistent with other materials. An additional labeling statement is required, however, to reflect the necessity of installing a 15-minute fire rated finish between the board insulation and the interior of the residence. DOE also requires that the manufacturer label the product by type as defined in HH–I–524B so that contractors can select a product which meets the requirements included in the installation standards.

8. *Polyurethane and Polyisocyanurate Insulation Board.* The standard for polyurethane and polyisocyanurate board contained in Section 456.810 is based on FTC Part 460, CPSC Part 1209, F.S. HH–I–530A, and ASTM E–84.

Requirements for thermal resistivity, flame spread, water vapor permeability, compressive and flexural strength, dimensional tolerances, and marking are consistent with those for polystyrene board. Although water absorption is determined by the same method for all three types of board, polyurethane and polyisocyanurate are allowed a wider acceptable range since the application of these materials is limited by the installation standards to above grade application. Composite polyurethane and polyisocyanurate (like polystyrene) must also be labeled as to the permeability of each manufacturered thickness. The same labeling requirement for the 15-minute finish rated covering applies to polystyrene and polyurethane and polyisocyanurate.

9. *Aluminum Foil Reflective Thermal Insulation.* The standard for reflective insulation contained in Section 456.811 is based on CPSC Part 1404, F.S. HH–I–1252B, and ASTM E–408.

As with all insulating materials, the FTC 460 requirement for thermal resistivity and labeling is applicable. DOE is also specifying that the requirements for foil, kraft paper and adhesive included in HH–I–1252B be met.

These were determined necessary for several reasons. For instance, if impurities are contained in the

aluminum foil, the reflective ability will be reduced. The adhesives used must be water proof and must demonstrate permanence for the material to remain effective.

DOE determined that another requirement unique to reflective foil—that of thickness—be included. Material that is too thin will not remain durable and effective. DOE therefore referenced HH–I–1252B when citing minimum thickness of the material.

As with other materials which purport to be relatively impermeable, requirements for water vapor permeability are included. DOE references HH–I–1252B. Since pliability of the material affects installation and therefore effectiveness, requirements were included from HH–I–1252B. In addition to the standard labeling requirements, DOE has also specified design characteristics of the material to ensure that the reflective surfaces can function as they were intended.

*C. General Comments*

Approximately 200 comments from manufactureres, industry associations, and Government agencies were received which dealt with the entire Subpart H—Energy Conservation Material Standards.

Several commenters suggested that responsibility for ensuring compliance with the materials standards be specified. DOE does not feel it appropriate throughout the RCS Program for the Federal Government to designate responsible agencies for tasks included in a State Program.

Some commenters expressed concern about States promulgating standards which differ from the DOE standards being proposed. NECPA does not give DOE authority to prohibit such action by States.

Other commenters recommended that the proposed Material Standards be replaced with references to the appropriate existing Federal Specifications, ASTM Standards, and fire safety test requirements. This is substantially what was done in the Final Rule.

Several comments were received concerning the completeness and accuracy of the definitions. The appropriate revisions have been made.

One commenter suggested that existing HUD material standards are adequate to determine a material's acceptability, and that simpler requirements are needed which allow a layman to determine if a product complies. DOE has only included requirements that are necessary to assure a minimum level of safety and effectiveness. Since virtually every requirement was extracted from existing industry and Government standards, DOE maintains that they are acceptable to those impacted. The standards included in Subpart H are not intended for the layman. They are instead legal requirements. The label "conforms to DOE standards" should help the layman determine if the material complies. Other labeling requirements have been included to give the layman additional information.

One commenter stated that the standards are overly complicated, and that they will discourage participation of suppliers and contractors in the RCS Program. This commenter recommended that the DOE Standards be limited to those set by local standards and codes. Every effort has been made to simplify the standards. The DOE Standards establish only the minimum requirements necessary to assure safety and effectiveness, which is required by NECPA. Since local codes often do not address material standards for weatherization materials, DOE could not depend upon local code organizations.

*D. Specific Comments*

Over 200 detailed comments were received from manufacturers, industry associations, other government agencies, and individuals, on specific sections of the material standards of the proposed rule. These comments suggested revisions, clarifications, amplification, deletion, or approval of various provisions of each standard. These comments are summarized in the following pages together with DOE's assessment of these comments. Also included is an explanation for modifications made to the proposed standards in response to comments.

1. *Section 456.803—Cellulosic or Wood-Fiber Loose-Filled Thermal Insulation.* One commenter suggested that spray-on cellulosic insulation be included in the scope of this standard. DOE decided to specify in the final rule that the standard applies to loose-fill only, since spray-on cellulosic insulation is principally used for commercial applications, and since no material specification is available. If and when one does become available, DOE will reconsider.

Several comments were received on thermal resistance. One suggested that the minimum R-value be 3.7 instead of 3.0 which DOE had proposed. Another commenter suggested that the five percent tolerance on R-values for four specimens was too tight. DOE has determined that it is outside the scope of the RCS Program to specify R-values for the various kinds of insulation. Since all insulation will be labeled according to R-value and since the audit will address the relative cost-effectiveness of insulation, there should be no need to require minimum R-values. In addition DOE no longer specifies a method of determining thermal resistivity since the FTC procedure must be met by all insulation manufacturers.

Several comments were received on fire safety. One claimed that cellulose insulation does not pose a fire hazard. One suggested that the smoldering combustion test is not severe enough. Other commenters supported the proposed fire safety test methods, but suggested various modifications. DOE has not changed the proposed requirements. DOE has agreed with the CPSC and the U.S. General Services Administration to specify the same fire safety requirements and test methods for cellulosic loose-fill insulation.

Three commenters addressed the moisture absorption requirement suggesting that the seven percent maximum limit it too restrictive and can be loosened to 15 or 20 percent with no ill effects to consumers. The final rule limits moisture absorption to 15 percent to ensure consistency with the Federal Specification.

One commenter claimed that CPSC test method for corrosiveness of cellulosic insulation does not give reproducible results because of the variability of conditions within most humidity test chambers. DOE has been working on a retest procedure which could be used if at least 2 of the 6 test coupons show no evidence of corrosion. CPSC may agree that the test is a valid one and incorporate it in their 1209 Rule. In the meantime, research efforts are continuing toward the development of a uniform corrosiveness test that is applicable to all thermal insulating materials.

Six comments dealt with the labeling requirement for cellulose. One suggested that each manufacturer develop his own label. Another suggested that cellulose insulation packages carry a UL or Factory Mutual label. The other comments concerned the wording of Table I, the coverage chart. The Final Rule assumes that a warning label which meets the requirement in CPSC Part 1209 will be included on all bags of cellulosic insulation. The DOE will not require a UL or FM label because it is inappropriate for the Federal Government to require labeling by particular private testing laboratories. As was explained earlier in the preamble, DOE maintains that the coverage chart is essential in ensuring proper coverage.

2. *Section 456.805—Mineral Fiber Loose-Fill Thermal Insulation.* One

commenter suggested that the distinction between Classes A and B based on ignition weight loss is meaningless. DOE agreed with the commenter since the RCS Program makes no effort to differentiate between applications of the 2 classes. Reference to classes was therefore deleted.

Five comments addressed the requirement concerning weight loss on ignition. Three said that this requirement is not a fire-safety issue and two comments recommended that there be no limit to weight loss on ignition for Class B material. In the final standard, the weight-loss on ignition requirement has been removed from the fire-safety section, but the requirement has been retained as a material characteristic. By limiting weight loss on ignition to 12%, DOE limits the amount of binder content. This requirement is included in ASTM C767–73 as well as HH–I–1030A.

Two commenters suggested that until a test method for design density is developed, the test methods for mineral fiber loose-fill should be conducted at the manufacturer's recommended installed density. They also recommended this density value be used in calculations for the coverage chart, Table II. The density of mineral fiber loose fill is directly related to thermal resistivity. The FTC 460 Rule, published subsequent to the RCS proposed rule, addresses thermal resistivity, so we have removed this provision from the Final Rule. However, DOE will continue its research efforts to develop a uniform method of determining design density for mineral fiber. A method is needed so that requirements for cellulose and mineral fiber are consistent.

Three comments addressed the thermal resistance of mineral fiber loose fill. One suggested that specimens tested be at least 3.5 inches thick. Another claimed that the R-value is not a meaningful measure for installed thermal resistance unless the insulation is protected from air convection. In an effort to promote optimum consistency among standards, DOE determined that no requirements for thermal resistance were necessary since FTC Part 460 already addresses this issue.

With regard to fire safety, one commenter suggested that mineral fiber loose fill be tested in accordance with ASTM E–84. DOE still maintains that the radiant panel and smoldering combustion tests more accurately simulate fire conditions in an attic environment than does the tunnel test.

One commenter suggested that the limit on moisture adsorption be increased from 5 to 7%; two commenters suggested reducing the limit to 1%. DOE eliminated the requirement for moisture adsorption since there was no evidence of problems.

Several comments were received suggesting that odor emission and corrosion tests for mineral fiber should be the same as for cellulose insulation. DOE agrees in principle with the comment. The odor emission test was changed in the Final Rule to be consistent with that for cellulose. The corrosion test was left unchanged, although research is underway to develop a single corrosion test that will apply equally to all insulating materials.

One commenter suggested that the fungi-resistance requirement be deleted. The Final Rule retains this requirement because organic binder is contained in mineral fiber loosefill which can promote fungus growth.

*3. Section 456.806 Mineral Fiber Batt and Blanket Thermal Insulation*

One commenter suggested that Type III material be included, "blankets and batts with a membrane covering on both faces, only one of which is a vapor barrier."

The Final Rule makes no distinction between classes, since application of specific classes is not referenced elsewhere.

One commenter suggested that thermal resistance be measured using specimens at least 3.5-inches thick. Again, DOE no longer includes thermal resistance requirements.

One commenter suggested that the ASTM E–84 test be specified to measure the fire resistance for blankets and batts intended for exposed use in crawl spaces and basement ceilings. This commenter also suggested that the critical radiant flux test be conducted with the membrane covering face up in the tray if there is a probability that the membrane facing will be left exposed. Another commenter claimed that in a fire test, fiberglass insulation melted quickly and released toxic fumes. Again, DOE does not specify the E–84 test for batts and blankets because it measures only surface burning characteristics while the radiant panel and smoldering combustion tests more accurately simulate fire conditions.

Both CPSC and DOE have determined that there is no reason to require testing of the batt in the radiant panel test with the vapor barrier facing up, if the product is clearly marked with the proper method of installation.

Several commenters suggested that the moisture adsorption limit be revised; some wanted it lowered to 1%; one wanted it raised to 7%. As discussed earlier, the moisture adsorption requirements for mineral fiber were deleted from the Final Rule.

One commenter questioned the need for the odor, corrosiveness and fungi-resistance requirements. These requirements have been retained in the Final Rule to ensure that mineral fiber with organic binders will not sustain odor or fungal growth.

*4. Sections 456.807 and 456.808—Vermiculite and Perlite Thermal Insulation*

One commenter recommended that the classification by type and size of vermiculite be revised to conform to the values for density and grading in the proposed ASTM Standards Specification C516 for Vermiculite Insulation. All classifications have been deleted since no reference was made to them in the Installation Practices. Minimum values for density and grading must be met, however, per ASTM C–516. The commenter also suggested that two classes of vermiculite be included: water-repellent for use where condensed water may be a factor (i.e., below grade); and non-water repellent, for use where condensed water is not a factor. DOE determined that all vermiculite and perlite products should meet the water repellent requirement since moisture is not always anticipated.

One commenter pointed out that the combustibility test for vermiculite required exposure to flame for 13 seconds, where as for perlite the requirement was 15 seconds. The Final Rule requires that both materials meet the combustibility requirements (15 seconds) of HH–I–585C & HH–I–547B.

*5. Sections 456.809 and 456.810–Polystyrene, Polyurethane and Polyisocyanurate Thermal Insulation Board*

Several comments were received on Polystyrene insulation board. One questioned the need for specifying levels of R-value and density. One stated that testing thermal resistance of boards with aluminum foil facing using the ASTM C236 method can give misleading results. As discussed earlier, both density and thermal resistivity are covered by the FTC procedure.

Several comments were received regarding fire testing of polystyrene, polyurethane, and polyisocyanurate boards.

One recommended that roofing and exterior insulation boards be exempted from the ASTM E–84 flame spread requirement, but if tested only the core material should be tested, and in the manufactured thickness. DOE maintains that all insulation materials should meet fire safety requirements and that they

should be tested in the same state they are installed. This means that composite boards must have a flame spread of 75 or less for each manufactured thickness.

Others stated that the smoldering combustion test is inappropriate for all formed plastic boards. Because the smoldering combustion test has not been validated for application to rigid board materials, DOE would agree with the commenters. The requirement for the smoldering combustion test was deleted from the final rule. However, DOE will investigate the validation process. Two commenters recommended that a diversified testing clause be included for fire testing of foamed plastic thermal insulation boards. Comments also recommended that these two standards allow usage of foamed plastics as permitted by local building codes, based on diversified testing.

DOE does not believe that the Diversified Testing Clause is sufficiently well defined and cannot therefore recommend it or support its use. For a further discussion of this issue see the Preamble for Installation Standards.

One commenter recommended that requirements for compressive and flexural strength, water absorption, dimensional tolerance, water vapor permeability, holes, voids and depresssions, be deleted. Another suggestion was that the distinction between types, styles, and classes be deleted.

DOE does agree that some of these requirements are unnecessary and has therefore deleted those pertaining to holes, voids and depression and types, styles, and classses. The other requirements, as discussed earlier, were determined necessary.

*6. Section 456.811—Aluminum Foil Reflective Thermal Insulation*

Three commenters recommended that this product be deleted from the RCS program because it takes an unusual degree of care to achieve proper field installation and effectiveness depends on "perfect" installation. One commenter recommended limiting its installation to areas where complete coverage can be obtained, claiming that its effectiveness depends on an unbroken seal. Another suggested that consumers be protected against manufacturer's claims of R-values that are higher than test data support. Although DOE would agree that good installation practices are essential to the performance of the material, it is a viable insulation option. Therefore, DOE retained the standard for reflective insulation in the final rule.

One commenter requested that a fifth class be defined for this material, that fire testing be required for specific applications, and that a test method for pliability be included. The Final Rule does not address specific classes of the material since all types were deemed acceptable for inclusion in the RCS program. DOE agreed with the commenter that a pliability requirement is necessary to the overall effectivness of the material and incorporated it into the Final Rule. Fire safety test requirements are not required because DOE has no information to suggest that this product poses a fire hazard.

*7. Section 456.812 Standards for Caulks and Sealants, Water Heater Insulation and Heating/Air-Conditioning Ducts Insulation*

a. *Caulks and Sealants*

Standards for caulks and sealants contained in section 456.812(b) are based on applicable Federal Specifications and ASTM standards.

Only one comment was received on caulking material standards. It suggested that the generic terms given in Table X be deleted since the specifications are of the performance type and products other than those listed either meet the specifications today or may meet them in the future.

While agreeing with the commenter that products known under other names can meet the specifications, DOE also believes that the generic designations are useful for identifying which standard or specification a particular product needs to meet. To alleviate the concerns of this commenter and others, DOE has renamed the heading of the first column of Table X to read *"Examples* of Types of Caulk or Sealant".

b. *Water Heater Insulation*

The standard for water heater insulation contained in Section 456.812(c) is based on F.S. HH–I–558B. DOE also requires a flame spread rating (when tested in accordance with ASTM E–84) of 25 or less on the exterior facing when installed on gas or oil-fired appliances and 150 or less on the exterior facing when installed on electric water heaters. The lower flame spread on facings installed on gas or oil-fired appliances was deemed necessary since the material is close to an open flame. DOE is concerned that residents interested in purchasing water heater insulation under the RCS program are able to easily identify products which meet the standards contained in § 456.812(c). A specific labeling provision was therefore included for insulation which meets the requirements of § 456.812(c) but is not specifically packaged as water heater insulation. Residents will be encouraged to look for "Conforms to DOE standards for water heater insulation" on the product when purchasing water heater insulation.

One commenter recommended that DOE include a performance standard specifying that products must be a minimum of .125 lb./sq. ft. DOE did not accept this suggestion since standards included here are the minimum necessary to ensure safety and effectiveness. While a requirement for .125 lb./sq. ft. would ensure a higher R-value, DOE determined that this was beyond the scope of the program.

One commenter suggested that there are many other options for water heater insulation besides the mineral wool batts specified. The commenter suggested, among others, loose fill and rigid board. DOE is not aware of practical applications of water heater insulation with these materials. If specific products are brought to DOE's attention, they can be evaluated for safety and effectiveness.

c. *Duct Insulation*

The standard for duct insulation contained in Section 456.812(d) is based on F.S. HH–I–558B. In addition, DOE requires a flame spread rating (when tested in accordance with ASTM E–84) of 25 or less on the coverings. This requirement is consistent with other requirements for materials which are left exposed. One commenter suggested that duct insulation should meet UL 181 rather than HH–I–558B. DOE maintains that this specification is not applicable to the RCS Program since it covers metal ducts, not retrofit insulation for these ducts.

8. *Section 456.813*

a. *Storm and Thermal Windows, Storm and Thermal Doors and Multiglazing*

Standards for Storm and Thermal Windows contained in Section 456.813 are based on ANSI/AAMA 1002.9–1977, ANSI/NWMA I.S. 2–73, NBS/PS26–70, and BOCA Research Report No. 7233.

Storm windows may have glass or plastic glazing, and frames made of aluminum, wood, vinyl or acrylic, and they may be installed inside or outside of the primary window.

Several commenters suggested that the DOE standards for storm windows require a higher level of performance with respect to air infiltration than is contained in the ANSI standard. Commenters claimed that the present levels of air infiltration (2.0 to 4.0 cfm/FCP) does not address energy conservation concerns. The commenters recommended that maximum air infiltration be reduced to 0.5 cfm/FCP.

Commenters said that most manufacturers could meet the more stringent requirements with little additional cost.

Although DOE is concerned about excess air leakage around windows, DOE is unsure about the efficacy of such a dramatic departure from existing standards. The purpose of exterior storm windows is primarily to provide an insulating air infiltration. Conventional theory requires that the insulating air space be ventilated to the outdoors to prevent condensation on the exterior storm window and the surrounding construction. Such ventilation is commonly provided by installing a storm window that is less tight than the prime window and by providing weep holes. If greater air tightness of the overall window system is to be provided, such should be accomplished by either weatherstripping the prime window, replacing the leaky prime window with a thermal window, or installing a tight interior storm window. This position is currently considered "good practice". Since existing prime windows seldom (if ever) approach the 0.5 cfm/FCP air tightness advocated by these commenters, serious condensation problems are likely to occur if the tight storm windows were installed.

Since the Navy is installing storm windows which meet the 0.5 cfm/FCP requirement on a test basis, DOE will have opportunity to observe the results. In the meantime, DOE has elected to set a maximum allowable infiltration rate of 2.0 cfm/FCP without stipulating a minimum.

DOE does require, however, a maximum air filtration rate of 0.5 cfm/FCP for thermal windows and a heat transmission factor of 0.7 btu/hr.-ft.$^{2}$ ° f.

One commenter suggested field testing, at the contractor's expense, to assure that the windows meet the specified air infiltration rating. DOE felt the suggestion was premature since ASTM E–06.51 is only now developing a standard field test method. Once such a standard is available, however, it could be used for quality control tests by the inspectors. Until a standard test method is available, this is not possible. To require each window to be tested would add substantial cost to the installation which DOE will have to weigh against the benefits to be gained.

One commenter suggested that T6 aluminum be specified to ensure longer life of aluminum windows.

T6 tempered aluminum would provide an installation with somewhat longer life, but DOE does not believe that the additional cost would be justifiable in terms of energy conservation.

Another comment suggested that all manufacturers submit with their bids a test report from an approved laboratory indicating that the product meets the standard, drawings, and window model specifications. Since no one solicits bids from manufacturers under the RCS program, the comment is not entirely applicable. It does, however, indicate the need for some form of control over products which are certified to "conform to DOE standards." After much deliberation, DOE decided not to require independent laboratory test results since this may result in considerable additional expense for a manufacturer with unclear benefits in terms of quality assurance.

One commenter suggested adding "rigid acrylic" to window frame materials. DOE agreed that rigid acrylic frames could be an effective storm window and included them in the Final Rule if they met the requirements included in BOCA research report No. 72–33.

*9. Clock Thermostats*

The standard for clock thermostats contained in the Proposed Rule was deleted since the referenced NEMA standards only partially addressed the product and since DOE is not aware of any general safety or effectiveness problems associated with clock thermostats.

*10. Urea-Formaldehyde Foamed-in-Place Insulation*

Numerous comments were received on the material standard for Urea-formaldehye foamed-in-place (UF foam) insulation. The comments were extensive and varied, leading DOE to continue research on UF foam.

Based on the comments and additional research, DOE determined that the standard contained in the Proposed Rule would not adequately address safety and effectiveness and that a much greater departure from the Canadian Standard for Thermal Insulation, Urea-Based, foamed in situ, 51–GP–24M (upon which the proposed DOE standard was based) was necessary.

Extensive comments were provided on:

- Criteria for UF foam equipment
- Criteria for certification of UF foam installers
- Derating of the thermal performance of installed UF foam
- Percentage of free formaldehyde in the resin and fresh foam

A new material standard will be proposed shortly for comment. Because the UF foam material standard to be proposed will be such a departure from the standard published earlier, DOE will provide another opportunity for comment. At that time, comments received on the UF foam standard published last spring will be addressed as well as an explanation for the approach taken by DOE in the new standard. The timing is such that a final standard for UF foam can be published prior to the implementation of the RCS Program.

**X. Subpart I—Energy Conservation Installation Standards**

All of the Installation Standards included in Subpart I are applicable only to existing residential buildings. They include minimum requirements for a generally safe and effective installation and in no way address the manufacture of the product, whether at the factory or at the installation site. Procedures included in the standards are general in nature; specific installation techniques, descriptions of the terminology and fundamentals of residential construction, and applicable local codes and regulations are not included. Although minimal safety provisions are included, *these are meant to protect the homeowner rather than the person installing the measure.* It should be noted that although these standards will provide the minimum criteria needed to ensure a safe and effective installation, actual conditions in buildings will vary greatly and in some cases, substantial additional care and precaution need to be taken.

There was a considerable number of comments suggesting that the Installation Standards were too prescriptive and that local codes and regulations should be used in place of DOE Installation Standards. The Installation Standards were originally written to ensure the general safety and effectiveness of the installation and to this end, each was reevaluated. Where it was determined that a standard was not necessary to ensure safety and effectiveness, it was deleted. Where specific provisions within an installation standard could not be justified on the basis of safety and effectiveness, they too were deleted. DOE decided not to give State and local building code jurisdictions responsibility for installation procedures used in the RCS Program, because few jurisdictions address the installation of those measures included in the RCS Program in existing housing. Where codes do address installation procedures for program measures, however, DOE has altered its position.

The proposed Installation Standards stated that they were "not intended to supersede the authority of State and

local codes and regulations unless the requirements of such codes and regulations are less stringent . . ." In response to comments, reevaluation of the intent of the legislation was made that led to a decision that DOE should not supersede local authority. The following revision is now contained in the Installation Standards: "This practice is not intended to supersede the authority of State and local codes and regulations, but is instead intended to establish minimum criteria for general safety and effectiveness. When State and local codes specifically address provisions contained herein, they may apply; when State and local codes do not address specific provisions contained herein, these practices shall prevail." The State Plan, however, should make clear when conflicts exist between the DOE standards and State or local codes and when and how these conflicts are to be resolved.

Whenever possible, DOE referenced consensus (or other recognized existing) standards for installation. Although few currently exist, DOE has approached ASTM about the need for standardized installation practices. ASTM has expressed interest in the proposed DOE standards and has ballotted both the window and insulation standards within the appropriate committees. At such time that the ASTM standards become finalized, and if DOE determines that the standards adequately ensure general safety and effectiveness, ASTM standards will be referenced in place of the DOE standards.

Since the Installation Standards are new and relatively untried, it is especially likely that they will need periodic revision. When new procedures or problem areas are brought to the attention of DOE, DOE will determine if changes are necessary and propose them for public comment. If DOE is merely referencing an existing standard, DOE will bring to the attention of the standard-setting organization the need for a revision. If a standard-setting organization revises a standard referenced by DOE, DOE will evaluate the revision and propose it for comment before deciding to adopt it.

One insulation manufacturer stated that following the DOE Installation Standards would result in serious problems when applying his product.

DOE therefore determined that if any manufacturer can provide information which confirms that a product cannot be safely and effectively installed with the DOE Installation Standards, or that a manufacturer's installation instructions result in a higher level of performance than the RCS standards, an exemption can be provided.

Comments submitted to DOE also reflected confusion between the Post-Installation Inspection contained within each Installation Standard and the Post-Installation Inspection described in § 456.313 of the proposed rule. The former inspection refers to a check made by the contractor of the installation he has just performed. The latter inspection is conducted by a third party to ensure the homeowner and the listing agency that all the requirements of the Installation Standards have been met. To avoid further confusion, the post-installation inspection in the final Installation Standards has been retitled "Post-Installation Procedures."

Several comments also stated that the Installation Standards were too complicated for contractors to understand and would therefore not be followed. The Installation Standards contained in the Final Rule are regulatory in nature, but were never intended to serve as an on-the-job handbook for installers. DOE will instead provide (for most measures included in the RCS program) an illustrated, practical interpretation of the Installation Standards to be used by contractors.

**Installation Standards for Insulation**

A. *General Issues*

1. *Need For an Installation Standard*

DOE determined that installation standards were necessary to ensure the safe and effective installation of insulation. Improper installation may reduce the thermal effectiveness of the insulation, may cause fire hazards or may lead to the deterioration of the structure. Specific hazards that can result from improper installation include:

a. Deterioration or failure of electrical wiring components and heat buildup caused by over-fused electrical circuits or by exposed metal wire conductors, when wiring is encapsulated in thermal insulation;

b. Fire caused by heat buildup from recessed lighting fixtures covered by insulation;

c. Flame spread on exposed flammable vapor barriers; and

d. Deterioration of wood structures, paint failures, and corrosion of metal fasteners and electrical components caused by prolonged moisture accumulation within building components.

Several surveys have been made to determine the general quality of insulation installations. One such survey was conducted by the Massachusetts Building Code Commission in 1978. The survey evaluated 80 reinsulated homes with the following results:

(1) Proper clearances were observed around heat sources only 50% of the time. This is usually a requirement of local building codes to reduce fire hazards, although in retrofit situations it is seldom enforced. Insulation which covers or surrounds recessed lighting fixtures or over-watted surface-mounted fixtures can cause sufficient heat buildup to ignite some kinds of thermal insulation or components of the fixture itself.

(2) Ventilation was observed in only 50% of the homes. Ventilation is necessary to evaporate condensation which occurs with winter temperatures. If the condensate has no opportunity to evaporate, it can settle in the insulation, rendering it ineffective, or it can permeate wood components, resulting in decay, structural damage, or deterioration of exterior finishes.

(3) Vapor barriers were installed upside down in 25% of the homes. Vapor barriers installed in this manner trap moisture between the insulation and the attic floor with the same results noted in (2) above.

(4) A wide variety of problems relating to cavity fill were observed by infrared thermography surveys, especially in installations using urea-formaldehyde foam material. When a contractor installs material blind in a cavity, substantial areas can be overlooked without the homeowner's knowledge. Inadequate cavity fill can result from blowing or foaming at an incorrect density or simply by carelessness.

Another survey conducted on 68 insulated homes in the Portland, Oregon area involved opening random wall cavities which had been filled with cellulose, mineral fiber, and urea-formaldehyde foam insulation.

Settling and incomplete filling of cellulose and mineral wool were observed. Of the twenty upper holes of the ten cellulose houses, eight had upper plates that were clearly visible along with the top of the insulation. Of those, one cavity was totally void, and another in the same house was void in the top 18 inches. This appeared to be a case of incomplete filling. Of the other full cavities, the cellulose was tight up against the top plate.

Of the thirty holes in the fifteen mineral wool homes, twelve had the top of the insulation and the upper plate clearly visible. Of the twelve, three cavities were void in the top or had settled by 2, 8, and 12 inches, respectively. In the last case an adjacent cavity was full, suggesting that the partially void cavity might not have

been filled completely. Once again the others were filled to the top, suggesting that the other cavities with voids or settling might have been incompletely filled. Numerous cases were also observed where UF foam was clearly incompletely filled in wall cavities.

In the 43 homes insulated with UF foam, shrinkage was higher than is generally reported. The mean shrinkage in thickness was 10.5% and the mean shrinkage in width was 8.5%. Measuring vertical shrinkage was difficult because it was hard to distinguish between shrinkage and incomplete cavity fill.

In addition, the Tennessee Valley Authority (TVA) has been sponsoring a home insulation program since July 1977. Out of over 50,000 homes which have had attics insulated and inspected, TVA estimates that insulation contractors were recalled 20% of the time to correct improper installations. (More recently the recall rate has dropped to about 10%). The most common reasons for recall are:

- Installing an insufficient amount of insulation
- Installing insulation over recessed lights
- Installing insulation over soffit vents.

Floor insulation, which has just been included in the TVA program since November 1978, is experiencing a 35–40% recall primarily because the vapor barriers are installed incorrectly.

It is difficult to assess the incidence of insulation-related fires, since there is considerable inconsistency in fire data reporting. Determination of fire cause is often subjective and sometimes impossible. However, the Consumer Product Safety Commission (CPSC) collected data from four states which had relatively standardized reporting procedures. (Data was collected from California [1976 and 1977], Ohio [1977], Oregon [1977], and Missouri [1977].) The data showed 880 fires for which thermal insulation was cited as the first material ignited. It should be pointed out that the data does not include those situations where insulation caused sufficient heat build-up to initiate a fire, but where another material was the first to reach ignition. (See CPSC publication "Residential Electrical Wiring Systems and Thermal Insulation" August, 1979.)

These surveys and reports indicate that improper installation is relatively common and results in potentially dangerous situations and that there is therefore a need for standardized criteria.

2. *Wiring*

By far the greatest number of comments received on the Installation Standards concerned the wiring provisions. There is considerable laboratory data to show that when thermal insulation surrounds fixed wiring, the wiring can reach temperatures that far exceed those allowed by the National Electric Code. The severity of this hazard depends upon how high the temperatures go and how long the temperatures are sustained.

Laboratory tests at NBS showed that several variables influence the degree to which allowed wiring temperatures are exceeded. These variables include:

- Overfusing—If the overcurrent protection (either fuses or circuit breakers) is overfused, circuits may carry more amperage than intended.
- Bunched wires—circuits located in close proximity tend to absorb each other's heat.
- Damaged electrical systems—wires with frayed, cracked, or deteriorated electrical insulation, loose electrical connections, etc. can give off sufficient heat to result in hazardous conditions.
- Ambient temperature of the overcurrent protection device—the temperature at which a fuse or circuit breaker trips is dependent upon both the load being carried and the temperature of the room in which the overcurrent protection device is located. If the room is an unheated space, the wiring temperature may have to reach temperatures higher than the electrical system is rated at before tripping.

Temperature limits set by NEC can be exceeded minimally simply by surrounding a single new wire, carrying its rated load with thermal insulation. DOE does not know how this affects long term deterioration of the wiring system. However, hazardous temperatures will not be reached unless 1 or more of the variables noted above are present. NBS laboratory tests were discontinued at 300° F (to prevent ignition of the test set up) when 135% of rated current was passed through parallel wires which had no overcurrent protection were surrounded by thermal insulation. Although it seems unlikely that many homes would experience more than 1 of these conditions, more information is needed on the relative frequency of electrical deficiencies.

In the proposed rule, DOE suggested installing a trough under and around electrical attic wiring so that any heat generated within the wire would be allowed to dissipate to the air above it. Many commenters suggested that this was in impractical and unworkable way to address the problem, but no alternative suggestions were offered. Most commenters did not or could not acknowledge that the hazard was a real one. DOE, along with the CPSC and the NBS, all agree that the potential for a hazard exists when thermal insulation is placed over and under wiring. There is still, however, a lack of information available on the probability of that hazard being realized and the best way to solve the problem. CPSC is in the process of collecting fire incidence data from fire marshalls across the country. A total of 880 fires were recorded in four states over a one to two year period where thermal insulation was the first material ignited. Of these fires, the most common cause of the fires (17%) was fixed wiring. Specifically, the causes were deteriorated electrical insulation and overfusing. Data needs to be collected and verified to determine how accurate and representative the information is.

DOE, in conjunction with the utilities across the country, is in the process of measuring temperatures reached by attic wires and the length of time the temperatures are sustained. The demonstration will include approximately 2,000 homes and will help DOE determine how significant a correlation exists between laboratory data and conditions in actual homes. Until this data is collected and analyzed, a section for a wiring provision will not be included in the Final Rule.

3. *Moisture Control Requirements*

A wide range of comments was provided regarding the vapor barrier requirements. Many commenters thought that the provisions in the Proposed Rule were too lax. They suggested that a vapor barrier be required whenever wall insulation was installed and that it was equally as important to install a vapor barrier in Condensation Zone 3 (See Figure 1 in § 456.905(C)(2)) as it is in Zone 1. Several commenters who made these suggestions were from the State of Oregon. In an effort to resolve these conflicts, DOE, in conjunction with the Oregon DOE, several northwest utilities, and others, conducted a demonstration to determine if homes in the Portland area (Condensation Zone 3) were likely to experience moisture problems if walls were insulated without a vapor barrier. Much attention had previously been given to a report written by Oregon Department of Veteran Affairs which stated, "As the use of insulation increases there will also be an increase in the potential of moisture damage to structures, from uncontrolled moisture. Vapor barriers, properly installed, are the best means of effectively controlling the migration of moisture within the structure." Additional information

provided by the Oregon Department of Veterans Affairs (DVA) revealed that 40% of the homes accepted as security for a DVA loan that were more than 3 years old had visible moisture damage requiring repair and the average cost of repair was $700. DVA claimed that "the cost of repairing damage caused by uncontrolled moisture reaches $407,000 per month or nearly $5,000,000 per year."

The report implied that moisture damage was caused by insulation without a vapor barrier. Further investigation of this report showed that no effort was made to determine whether or not insulation existed in the wall cavities with moisture problems nor was any effort made to categorize the cause of the moisture. In other words, many (or perhaps most) of the problems were possibly due to plumbing leaks within the wall cavity or penetration of water from the exterior of the wall.

In the demonstration noted earlier, which was partially funded by DOE, 98 wall cavities of Portland residences were opened to take moisture readings from insulation and structural components. All of the wood samples had less than 20% moisture content, with an average moisture content of 11.8%. This is well within the normal range for moisture content in wood. This demonstration, as well as input from experts around the country, led DOE to determine that vapor barriers should not be a requirement in Zone 3, nor should they always be a requirement when insulation is installed in walls. The Installation Standards remain mute on the issue of installing a vapor barrier in Zone 3 so that if local authorities feel it is necessary, they may add the requirement. In the same way, if local authorities determine that other aspects of the Installation Standards are not stringent enough, they may add additional requirements.

4. *Clearances Around Heat Sources*

Several commenters requested that DOE eliminate "non-flammable rigid cardboard" as a barrier material around heat producing devices. The material was eliminated since it is difficult to establish test and inspection criteria for the material. Non-flammable rigid cardboard is also less durable than other materials cited.

The proposed rules required a 3-inch minimum air space around all heat-producing devices and appliances. As one commentor pointed out, this is inconsistant with provisions of the National Fire Protection Association (NFPA). NFPA numbers 54, 31, and 211 are referenced in the Final Rule to cover clearances around gas and oil-fired appliances, vents, chimneys and their connectors. The Final Rules specify clearances which must be maintained between heat-producing appliances and combustible materials. Non-combustible materials are defined as meeting the provisions of ASTM E–136. Therefore, when installing insulation materials which meet the requirements of ASTM E–136, the clearances around vents, chimneys, and their connectors need not be observed.

Several commenters said that the requirement for all barriers around heat sources should be eliminated since the practice may be costly. DOE still maintains that it is not possible to assure compliance with either the NEC (when maintaining clearances around lighting fixtures) or NFPA (when maintaining clearances around heat-producing appliances) without installing a barrier between loose-fill insulation and the heat-producing device. Higher levels of insulation cannot form a permanent self-retaining wall. In addition, ventilation or other disturbances in the attic could easily destroy a retaining wall made from the insulation itself. DOE determined that barriers should be installed according to § 456.905(c)(1)(iii) whenever insulation not meeting the noncombustible criteria is installed around specific heat sources identified in the provision.

Two commenters mentioned doorbell transformers as a heat-source which should be specifically mentioned when maintaining clearances. DOE maintains that the existing wording which includes "other heat-producing devices" is sufficient.

5. *Contractor Liability*

There was considerable concern by contractors that some of the provisions in the Installation Standards would result in greater contractor liability. Specifically cited were those provisions in the Proposed Rule which required inspection of the building to determine whether or not a moisture problem exists and which required a determination of the structural soundness of the building. Although DOE still thinks the intent of the provisions is justified, they have been reworded to reduce contractor liability (See § 456.905(c)(vi)).

6. *Limitation of Insulation to Areas Between Conditioned and Nonconditioned Spaces*

Several commenters suggested that insulation should be allowed to be installed in areas other than between conditioned and non-conditioned spaces. Conditioned space is defined as an area serviced by a heating or cooling system. (This means that rooms which are essentially closed off from the rest of the house could be defined as unconditioned spaces.) They felt an exception should be made where individual room control or zone heating or cooling is used. DOE agrees that there are advantages (primarily comfort) to insulating all four walls of a zone heated room. The economic advantages, however, would be minimal at best. DOE still thinks that the purpose of insulation (as well as all program measures) in the RCS Program is to conserve energy and it must save a sufficient amount of energy to make the investment reasonable. Therefore, DOE has defined wall, floor, and ceiling insulation in a manner to exclude insulation between conditioned areas. See § 456.105.

There is no need to prohibit such installation in the installation practice. This might give the impression that home owners should not insulate between conditioned spaces for reasons other than energy savings.

7. *Limitation of Wall Insulation to Walls Which Previously Had None*

Several commenters felt this was an unreasonable position since a homeowner could achieve additional savings by adding insulation to an already insulated wall. DOE still maintains that additional wall insulation is unlikely to result in sufficient energy savings to offset the cost of the installation, but, it was determined that this issue is more appropriately handled in the audit because it involves the cost effective use of the measure, not its safety or effectiveness. Wall insulation is not an applicable program measure where wall space already has insulation. The provision prohibiting additional wall insulation was therefore eliminated in the Installation Standards in the final rule.

8. *Ventilation Requirements*

The proposed Rule required that one of three ventilation options, consistent with the HUD MPS, be met within six months following the installation of attic insulation. Several commenters suggested that six months should not be allowed to pass before ventilation was installed, especially if an appliance using inside combustion air was located in the area to be insulated. DOE agreed with these comments and has removed the six month time frame.

Some commenters suggested that the ventilation requirements were too stringent. They suggested that relatively arid climates did not need the same amount of ventilation required by more humid areas. DOE agrees that this may

be a fair assessment, but more information is needed. DOE will therefore be examining this issue, both in the laboratory and in the field. If our examination verifies statements received during the comment period, the Installation Standard will be revised accordingly using the procedures described earlier.

One commenter provided a specific example of flat-roofed row houses in Baltimore which could not accommodate the ventilation requirements. The commenter questioned the need for ventilation since the fascia construction is loose enough to permit the escape of moisture. DOE maintains its position that ventilation is an essential prerequisite to insulation. Under the RCS program, an alternative to installing insulation in the attic space where adequate ventilation cannot be provided, would be to install board-type insulation on the interior of the ceiling.

B. *Specific Insulation Issues*

1. *Loose Fill*

One commenter said that DOE had omitted an important retrofit application to interior walls—that of installing furring strips, an interior finish, and blowing in loose fill insulation. DOE determined that this was an expensive and unlikely application and one which was not likely to be cost-effective. The suggestion was not incorporated.

Several commenters requested that a separate standard be issued for loose fill mineral fiber instead of combining it with the requirements for cellulose. Although DOE would agree that requirements should vary depending upon the characteristics of each insulating material, the only significant difference in application as described in the Installation Standards relates to the combustibility of the materials. In the proposed rules, a three-inch airspace was not necessary when installing mineral fiber, perlite or vermiculite around flues and chimneys. The Final Rules do not differentiate between materials except to say that only materials which are non-combustible per ASTM E–136 may be installed next to flues and chimneys.

All types of loose fill insulation are combined in the Final Rule in one standard. The standard now includes mineral fiber (including rock wool and glass fiber), organic fiber (including cellulosic), and mineral cellular (including vermiculite and perlite). Although mineral fiber and organic fiber are generally blown, while mineral cellular is more commonly poured, DOE has determined that there are not sufficient differences in the application of these materials to justify two separate standards. One provision regarding maximum allowable loads on attic floors originally contained in the Proposed Rule under "Standard Practice for the Installation of Mineral Cellular Loose-Fill Thermal Insulation" is reserved in the Final Rule pending additional comments.

2. *Mineral Fiber Batts and Blankets*

One commenter requested that DOE delete its requirement for a 15-minute finish rating (per ASTM E–119) on the interior side of kraft-faced batts and blankets. DOE has no justification for removing this requirement since most building codes specifically require it. If building codes specifically permit less than a 15-minute finish rating, DOE will also accept the code requirement (See Section 456.904(a)(3)).

Other commenters requested that the requirement to tape tears and joints in the vapor barrier and ground cover be deleted. DOE did not delete these requirements since tears and joints destroy the effectiveness of the vapor barrier. If the insulation facing is to serve as a vapor barrier as defined in § 456.903(b)(26), penetrations cannot exist.

3. *Rigid Board*

Considerable confusion existed in the Proposed Rules regarding vapor barrier requirements. These have been rewritten in the Final Rule in tabular form for clarity (See § 456.907 Table 1). Generally, requirements for vapor barriers are determined by permeability of the insulation, existence of insulation in the wall cavity and the location of board insulation. In addition, where the manufacturer recommends venting of the wall cavity to the outside, this should be provided.

Several commenters said there was no justification for installing a protective cover over the board around the exterior perimeter unless impact is expected. In most applications, they claimed backfill provides sufficient protection. The Final Rule requires a protective cover only above ground.

One commenter suggested that only boards with a water absorption of 0.1% or less when tested in accordance with ASTM C–272 should be installed on foundation perimeters. DOE agreed with the suggestion and will limit underground applications of rigid board to Type III Polystyrene as described in Section 456.808.

There was considerable controversy over the validity of the Diversified Test Clause in determining when a 15-minute fire rated finish is necessary. Most building code jurisdictions reference ASTM E–119 to determine the finish rating requirements of building constructions, including that of rigid board insulation materials used in a wall system. Some jurisdictions, however, have determined that the "Diversified Testing Clause" can be more appropriately used to determine the fire characteristics of the rigid board materials. DOE does not wish to supersede local codes and regulations. The Installation Standard therefore requires the 15-minute finish rating on the interior side of rigid board materials. However, Section 456.904(a)(3) was included so that if local codes specifically require or allow the Diversified Testing Clause, the local provision will prevail.

4. *Reflective*

Considerable controversy existed on whether or not to include reflective insulation in the RCS program. Comments from varied sources said that the material, in its installed condition, was inferior to other forms of residential insulation. DOE found no evidence to substantiate this. Tests conducted by the NBS show reflective insulation to be a viable insulation. It was also determined that there was no justification for limiting the use of reflective insulation to underfloors only. Although the thermal performance of the material is reduced when installed in walls and ceilings, it was determined not to prohibit this application.

Several commenters said that dusty, dirty surfaces would reduce thermal performance. Although this is true, it was determined unlikely that more than one surface of multilayered material would become dusty or dirty, thus reducing the insulating value only minimally.

One commentor said that an electric short circuit is possible where the reflective insulation contacts wires. Although this is true, the proposed and final rule require that all electrical equipment be grounded prior to installation. DOE maintains this precaution will substantially reduce the potential for short circuiting. Some commenters said there was no justification to require the taping of joints. DOE has determined that taping of joints is essential to maintain the integrity of the separation of individual air spaces. The original provision requiring taping of joints was retained.

5. *Ducts*

One commenter suggested inclusion of a note which warns about the potential of freezing pipes when ducts in unheated basements or crawlspaces are insulated. DOE has included a note

similar to the one already included in all Installation Standards which address basement or crawlspace insulation.

One commenter suggested that duct insulation be limited to ducts in unconditioned spaces. Although some energy savings are likely regardless of the location of the ducts, DOE agreed with the suggestion because duct insulation is most effective in unconditioned spaces. One commenter suggested that joints of duct insulation need not be butt-jointed. The commenter suggested joints could be overlapped and that tape was only necessary when vapor barriers were attached. DOE agreed that overlapping was an acceptable alternative method and revised the installation standard accordingly. (See § 456.905(d)(5)(iv).)

6. *Water Heater Insulation*

DOE determined that a standard for water heater insulation is necessary since hazards such as fire, burns from scalding water, and release of toxic gases could occur if the insulation is improperly installed. Improper installation includes:

(a) Installing insulation in such a way so as to block the drafthood relief opening or pilot light air intake.

(b) Reducing the heat loss sufficiently so that the pilot light input is greater than the jacket heat loss. This could result in overheated water or opening of the pressure relief valve.

Several people commented on these potential hazards and expressed concern about installing insulation on gas-fired water heaters. Concerning improper installation around drafthoods and pilot lights, DOE maintains that if reasonable attention is given to the Installation Practices, a hazardous situation is unlikely to occur. A DOE Report ("Insulation Refit Kit for Domestic Water Heater" March 23, 1977) states ". . . the warning on the installation instructions, together with the odds of achieving exactly the correct amount of air blockage, coupled with a positive downdraft, all result in a very small risk."

Reducing the standby loss through the tank to the extent it is exceeded by pilot light input was also a concern to some commenters. Tests conducted by Calspan Corporation for the CPSC showed that this was an unlikely occurrence except on old units with exceptionally large burners with high pilot input.

A vent damper, which is intended to reduce standby heat losses, could also lead to overheating of reinsulated water heaters. As a safety precaution, the Installation Standards prohibit the application of additional insulation to water heaters so equipped.

Some commenters suggested that water heater insulation only be recommended when the water heater is in an unconditioned space. The DOE publication noted above, shows that water heater insulation has a favorable payback regardless of the ambient temperature. Savings, of course, will be greater when the water heater is located in an unconditioned area. Although heat loss from the water heater in a conditioned space may reduce the load on the residential heating system, the space heating system is still a more efficient way to warm a home than a water heater. In addition, heat loss from a water heater in a conditioned space may add to the air conditioning load in summer. DOE has therefore not limited application to unconditioned spaces.

Many commenters suggested changing the terms "flue damper" and "flue pipe" as they relate to the definitions in § 456.903 and figures 2 and 8 in § 456.912 to "vent damper" and "vent pipe" to make them consistent with other definitions in the regulations. DOE readily agrees to this change.

One commenter recommended limiting water heater jackets to one-piece construction only to ensure safety. Although DOE agrees that 1-piece construction is safer than multi-piece construction, the Installation Standards contain minimum requirements and DOE has no information which shows multi-piece construction to be unsafe.

One commenter said that the facings noted in the definition in § 456.902(3) of the proposed rule are not non-combustible. The definition has been changed to replace "non-combustible" with a specific flame spread classification.

7. *Window Systems*

DOE determined that a standard is necessary to ensure the effective installation of window and door systems. Improper installation of units can reduce their thermal effectiveness, lead to excessive condensation and promote deterioration of wall constructions, windows, doors, and their respective finishes.

"The Standard Practice for the Installation of Storm Windows, Thermal Windows, Multi-glazing, Storm Doors and Thermal Doors" was submitted to ASTM for adoption in April 1978. If all negatives are resolved, an ASTM standard may be in place shortly. Future publications or revisions of the RCS regulations will therefore refer to the ASTM standard practice noted above.

It was not possible, nor did it appear necessary, to specifically address all types of window systems. DOE determined, for instance, that although guidance would be helpful, it was not necessary to include installation procedures for heat reflective or absorbing films. So many variables exist which impact the effectiveness of the films that it is difficult to be specific. Effectiveness, for example, is partially dependent upon climate and orientation. The summer effectiveness, for instance, of permanent, heat reflective film may be offset by the loss of potentially beneficial solar gain. DOE believes, on the whole, however, acceptable installations can be achieved by following the manufacturer's instructions. One manufacturer of a 4-mil PVC frameless plastic storm window requested the development of both material and installation standards for his product. It would be impractical to develop installation standards for specific proprietary products. The absence of a standard (either material or installation) does not prohibit any product from inclusion in the RCS program, unless DOE specifically determines that a standard is necessary for a particular product. All products, however, must meet the appropriate definition in § 456.105 to be included in the program.

Several commenters mentioned the need to reference the requirement for safety glazing in storm doors in accordance with CPSC standards. This reference is included in § 456.911(g)(1)(vi).

Several comments were submitted regarding types of fasteners and anchors required by DOE when securing storm windows. DOE required that only aluminum or stainless steel fasteners and anchors be used on aluminum storm windows to avoid galvanic corrosion. It is true that for some exceptionally arid areas, most plated fasteners or anchors could perform acceptably, and that some plated fasteners and anchors could perform adequately in areas of average rainfall. On the other hand, coastal areas may need special stainless steels (such as type 316) for highest performance. Because fasteners and anchors are not a high-cost item, DOE would rather err on the side of higher quality and avoid the potential of having to replace corroded parts.

Many additional comments were submitted by ASTM committee members and resolved in the appropriate subcommittee.

8. *Replacement Oil Burners*

DOE has determined a need for an Installation Standard for Replacement Oil Burners to ensure an effective installation and to provide criteria for

determining when a replacement oil burner is cost effective. The installation standard covers warmers, hot water, and steam heating oil-fired systems, but does not cover firing rate reductions for steam heating systems. This is because steam boilers are considerably less flexible in accepting firing rate modifications than hot water or air furnaces because of the boiler's need to provide the rate of steam distribution throughout the system. Because the efficiency of an oil-fired heating system is dependent upon clean surfaces and proper tuning, DOE has included in the Installation Standard a requirement for related procedures. A homeowner with a low efficiency furnace may not necessarily benefit sufficiently from a replacement burner to justify its cost. Tuning, cleaning, and optimizing the nozzle size may increase the efficiency of the existing oil burner considerably, so that a replacement burner is no longer a good investment. In addition, it is important for DOE to establish minimum criteria for determining the relative efficiency of the oil-fired appliance. Minimum criteria are included in § 456.913(c) to ensure some standardization of results.

Several commenters mentioned the importance of cleaning and tuning the oil burner to achieve optimum efficiency. DOE has therefore included a more complete requirement for evaluating and optimizing the existing burner which includes removing soot from heat transfer surfaces, sealing air leaks around burner tubes, cleaning or replacing air or oil filter, etc.

Two commenters complained about a DOE recommendation for replacement burner parts rather than burner replacement. DOE does not recommend replacement parts other than the nozzle which is a relatively an inexpensive item.

Several commenters objected to the replacement criteria in the proposed Installation Standards. Some commenters felt that replacement criteria were unnecessary. One commenter felt that any burner with a steady state efficiency of less than 75 percent should be replaced. Criteria are included in the Final Rule to help consumers determine how good an investment a replacement burner is. Few homeowners know enough about furnace efficiency to make judgments about this investment. As was stated in the Proposed Rule, the replacement criteria are based on economics—as are all the other key elements in the program. Actual replacement criteria are not included in other Installation Standards, however, because, for the most part, the other measures included in the RCS program are not replacements, but additions. One commenter felt it was the purpose of an audit, not the Installation Standard, to provide dollar savings information. While this is true, it would be burdensome for an auditor to conduct the cleaning and tuning tasks necessary to determine the efficiency of the burner. Replacement criteria are therefore retained in the Final Rule.

One commenter claimed the replacement criteria did not take into account the increased cyclic performance of the new high efficiency burners. Tests conducted by Walden Division of Abcor Inc., for NBS showed that both conventional and high speed flame retention heat burners have approximately the same relationship between their steady state and seasonal efficiencies. (See "Study to Evaluate the Energy Efficiency Improvement of Residential Heating Modification" by L. Katzman and J. Monat, May 1978, Walden.) In addition, they found that there was not significant difference between off-cycle losses on a system using a flame retention head burner as compared to the off-cycle losses using a conventional burner. When sufficient data becomes available, a correction factor will be added to properly credit burners that achieve a better seasonal efficiency as a percentage of their full load efficiency than conventional burners. In the meantime, DOE has determined that the procedure for replacement criteria treats both flame retention and conventional burners fairly and that the table presented in the proposed rule will be retained.

Regarding § 456.913(e) "Selection of a Replacement Burner," several commenters suggested DOE had erred in stating that the K-Factor may be too high if the house has been weatherized since the last heating season. DOE agrees with the commenters that the K-Factor may be too low. This change is incorporated into the Final Rule. Other commenters complained about the equation for determining the minimum nozzle size in the same section. Commenters stated that the minimum nozzle size could be "readily and accurately determined by the heat loss calculations made in the energy audit." This approach does not appear practical since DOE is not requiring a complete furnace audit to be done by the auditor. It is DOE's position that the equation in both the Proposed and Final Rule using the K-Factor is superior since it provides the integrated energy consumption over the heating season.

9. *Clock Thermostats*

Upon re-evaluation of the Proposed Installation Standard for Clock Thermostats, DOE determined that the standard was unnecessary. If manufacturer's installation instructions are followed, no serious safety or effectiveness problems should result.

The only comments submitted on the clock thermostat standard related to the applicability of clock thermostats to heat pump systems. Most commenters recommended that clock thermostats should not be installed on a heat pump system since, during the heat recovery period, the less efficient auxiliary resistence heating will be turned on. This, they argued, could offset the savings accumulated during the setback time period.

This position is contrary to that supported by NBS and ASHRAE. NBS, after holding a workshop on the subject in November 1977, concluded that if a thermostat were set back approximately 5 degrees per night, the homeowner would save energy approaching that which would have been saved with an alternate heating system. On any given night, if the temperature is near the system balance point, the homeowner may experience a net energy loss, but over the entire season the homeowner will save. "Savings in Energy Consumption by Residential Heat Pumps" published by Oak Ridge National Laboratory (ORNL/CON–4) claims, "Further reduction of temperature at night will produce additional savings with a heat pump, but not by as great a percent as may be achieved with a constant capacity system. The concern that increased use of auxiliary resistance heaters during the morning recovery period following night setback might result in increased energy consumption, rather than a saving, is seen to be unfounded." (For additional information see ASHRAE Transactions 1978" Energy Savings Through Thermostat Setback with Residential Heat Pumps.") DOE therefore maintains that, if care is exercised in the setback procedures, clock thermostats can result in energy savings on a heat pump system.

## XI. Regulatory Analysis and Urban Impact Assessment

The President, by Executive Order 12044, has directed agencies of the Executive Branch to conduct a Regulatory Analysis of regulations which they prepare that are likely to have a major economic impact. In accordance with OMB Circular A–116 to assess the impacts on urban centers and communities, an Urban and Community

Impact Assessment should be prepared when the proposed rule is a major policy and program initiative. This assessment should be incorporated into the Regulatory Analysis.

DOE determined that the Residential Conservation Service Program, authorized under Title II, Part 1 of the National Energy Conservation Policy Act, was a major action and required preparation of a Regulatory Analysis and an Urban and Community Impact Assessment. Consequently, the Department prepared the two analyses in draft in conjunction with the publication of the Proposed Rule for the RCS on March 19, 1979. These analyses have been finalized for publication in conjunction with the Final Rule. The Final Regulatory Analysis which incorporates the final Urban and Community Impact Assessment is summarized here. A single copy of the Regulatory Analysis may be obtained by writing: Mr. James R. Tanck, Director, Residential Conservation Service Program, Office of Assistant Secretary for Conservation and Solar Applications, U.S. Department of Energy, 20 Massachusetts Avenue, N.W., Washington, DC 20585.

*A. Responses to Comments on the Regulatory Analysis*

This part presents the public comments on the Regulatory Analysis (RA) and the responses to each. The specific comments and responses are presented according to topical areas. These are as follows: Section A presents comments on the analysis of impacts to states. Section B presents comments on the analysis of the program announcement which is required by the RCS Program regulations. Comments concerning the response rate to the Program are addressed in Section C. Section D presents comments on the analysis of the audit. Section E presents a comment on the analysis of impacts on home heating suppliers. Section F presents comments on the analysis of energy savings. General comments on the Regulatory Analysis are addressed in Section G. Section H presents comments on the Urban and Community Impact Analysis.

1. *Comments on the Analysis of Impact to States*

The following comments address that portion of the RA which analyzes impact on states. These comments, which address cost estimation and state regulatory authority impacts, and their responses follow.

Several comments stated that the projected costs of the RCS Program to the states is unrealistic and underestimates the percentage cost of the RCS Program to the states. The analysis must also focus on the ability of states to raise the necessary funds, and the impact of direct federal funding for those states that are unable to raise the necessary financing.

In addition to the national cost comparisons DOE used to evaluate RCS Program impact on all states, the DRA also includes other comparisons to show the level of impact on individual states. These include percentage increases in state energy office staff or the public utility commission staff, per capital costs, and program costs per million Btus of energy savings for sample states.

The analysis recognizes the issue of a funding source for state planning but does not include an in-depth analysis of these state-specific problems as the focus of the analysis is national. NECPA anticipated that existing state grants would be sufficient for the RCS Program; the analysis, however, suggests otherwise. It should also be noted that federal stand-by authority will be exercised in cases where states do not prepare an RCS plan.

It was also commented that auditor training costs will be greater than assumed in the DRA. Testimony presented at the hearing on the DRA includes estimated costs for auditor training which range from $63.00 to $75.00 per person per day for training sessions of an estimated duration of three days to three weeks.

In response it is noted that the RA estimates the cost of conducting a session at $45.00 per person per day plus curriculum development costs. The estimated development cost of $10,000 increases the per-person cost of providing training by different amounts in different states since the per-person development cost is dependent upon the number of auditors trained per state. For the nine sample states, curriculum development costs per auditor range from $11.72 to $416.00. The addition of these development costs to the cost of conducting training sessions raises the RA per-person estimate to an amount which in most cases exceeds those presented in the testimony.

A two-day training session has been determined to be adequate time for conducting a training session covering the content specified in the rule assuming that the trainee has some prior knowledge of basic housing construction.

Several comments also stated that master record maintenance costs will be greater than estimated.

A response to this testimony is not possible since supporting documentation to the statement that master record maintenance costs are too low was not provided. The costs estimated by DOE for maintenance of the master record take into account the anticipated workload which will be generated by listing activities and the number of employees which would be required to compile and maintain the master record. DOE believes that number of employees (one to four, depending on the volume of work) is a reasonable estimate of employment requirements and costs for the master listing activity.

Finally, the comment was made in regard to regulatory authorities that the area of rate case impact should be more fully explored in the regulatory analysis regarding the delay on other more important rate matters. Further, the regulatory analysis should fully address financing questions and economic impacts on utilities.

DOE disagrees with this comment, referring to the analysis of impact on state regulatory authorities which indicates that, in general, approval of rate increases due to utility implementation of the RCS Program will not result in a significant impact. It does point out, however, that in some circumstances, utility requests for expensing of program costs may result in a heavier workload for the state regulatory authority. A more detailed analysis was not conducted due to the indications of commissions contacted that the impacts could not be estimated based upon existing caseloads and a lack of data.

The impact of different program financing arrangements on utilities is shown through the various customer response rates which are based upon the direct cost of audit services to participating customers. Regarding the concern that utilities cannot recover the costs while a case is pending, further research has found that at least one utility offered the audit at a charge to the customer during a rate review period. The policy of this utility is that if the review finds that the audit may be fully expensed, and, therefore, given free of charge, those customers who had paid for the audit during the review period would be reimbursed for the audit fee.

2. *Comments on the Analysis of Program Announcements*

The following comments address that portion of the Regulatory Analysis which is concerned with the program announcements. These comments and the responses to them follow.

A number of comments stated that the cost estimate for the program announcement is too low, and that the cost of printing and processing the

announcement should have been included.

DOE agrees with these comments, and has conducted additional research which indicates that costs of printing and processing the program announcement would amount to approximately $.11 per announcement if developed by in-house utility staff, or $.25 per announcement if developed by another firm and purchased by the utility. For a utility of average size, the resulting range of processing and printing the announcement would be from $33,000 to $75,000. This cost would be incurred by the utility three times during the five-year Program. Therefore, the total processing/printing cost of the program announcement would increase the Program costs estimated in the DRA (Table IIID–34) by $99,000 to $225,000, or 1.30% to 5.48% over the five years of the RCS Program.

Additional comments on the Program Announcement costs stated that the assumption that the bulk mailing rate will be used is not sensitive to the fact that most people discard junk mail; therefore, if DOE wants the Program to be effective, utilities will have to use a more expensive form of mailing. The comment was also made that mailing costs will occur every other year; they should not be averaged over all years.

DOE does not agree with these comments and clarifies that the proposed rules does not require that the program announcement be sent by first-class mail, and the estimates given in the RA reflect the minimum cost that a utility would have to incur to fulfill the requirements of the rule. If, however, a utility of average size chooses to send the program announcement, the mailing costs would be increased by $19,800. This would increase the Program cost estimated in the DRA (Table IIID–34) by a range of 0.26% to 0.48% over the three baseline activity level estimates.

The RA also acknowledges that the cost of mailing the program announcement will occur every two years rather than annually in part 2c of Chapter IIID, pages III–103 to III–104. Placing one-half of these costs as part of the annual burden to an average-sized utility was done for the sake of completeness of that burden, and as an analytical construct. In this case, the relevant representations of the actual burden or cost to the utilities of mailing the program announcements are the five-year totals for the average-sized utility and for the aggregate.

3. *Comments Concerning the Response Rate to the RCS Program*

This section addresses the comments concerning the response rate to the RCS Program's audits. The comments and corresponding responses are presented below.

Several comments on the response rate stated that: (a) the response rate for free audits will not be a constant; rather it will be bell-shaped, and (b) 7 percent is too high since many audits will be paid audits, and a scenario with a paid audit should have been considered.

In responding to part (a) of this comment, DOE feels that a bell-shaped response to the RCS Program is possible if there is low response at the beginning of the Program and word-of-mouth plus advertising result in increased response, with a tapering off of response toward the end of the five-year Program. In researching energy audit programs which are presently offered, however, there was no evidence that demonstrated any specific pattern of response as being representative. The assumption of a constant rate of response was therefore chosen first, because no other shape of response was indicated by the available data, and second, because most utilities attempted to evenly distribute the number of audits provided each month as a way of managing the resources available to the utility.

In responding to part (b) of the comment, DOE disagrees, and the response rates are clarified as follows. The 7 percent response rate represents the maximum likely annual response which could be expected if the audit is provided free of charge. A second scenario is also presented in the full Draft Regulatory Analysis which represents the average likely response which could be expected if there were a nominal charge of about $15 for the audit. The annual response rate in this second scenario is 1.5 percent. Each of these response rates was based on data obtained from utilities which have audit programs similar in scope to the RCS Program. These data indicate the response rate falls to zero for an audit charge of more than $31. Therefore, if customers are charged the full cost of the audit, the response rate to the RCS Program is likely to be negligible.

A few comments stated that the assumed 75 percent follow-up installation rate is too high; 40 to 45 percent is more realistic.

In response to this comment, the same calculations were undertaken using a 40 percent follow-up installation rate. An assessment of this change is presented below for each of the three target groups which are impacted. Because DOE has not been able to find evidence to support the 40 percent rate, while it does have support for the 75 percent rate, the following is offered as a sensitivity analysis only, and does not imply agreement with the comment.

a. *Impact on Utilities.* Reducing the installation rate affects the following employment and cost categories as listed below:

| | Total aggregate employment (Percent) | | | 5-year aggregate cost (Percent) | | |
|---|---|---|---|---|---|---|
| | 75 | 40 | Change | 75 | 40 | Change |
| Employment category: | | | | | | |
| Administrative | 710 | 468 | −32 | | | |
| Clerical | 1,372 | 1,129 | −18 | | | |
| Post-installation inspectors | 444 | 198 | −55 | | | |
| Cost categories: | | | | | | |
| Arranging costs | | | | $115.1 | 54.4 | −52.7 |
| Post-installation inspection costs | | | | 103.6 | 67.3 | −35.2 |
| Total program costs | | | | 1,997.6 | 1,902.3 | −4.8 |

These figures show that, for utilities, the man-power requirements are reduced considerably, and the cost categories which reflect these changes in manpower are also significantly affected. These cost reductions, however, affect total program costs by less than 5 percent of the total aggregate cost of participation by all utilities.

b. *Impact on Home Heating Suppliers.* Reducing the installation from 75 percent to 40 percent affects only the manpower requirements and costs related to post-installation inspections for home heating suppliers. The manpower requirement in this category falls by about 50 percent, from 76 to 38 positions required each year for all home heating suppliers. This reduction in post-installation inspectors has no significant impact on the five-year aggregate cost of the Program: this cost falls from $785.1 million to $776.7 million, or only 1 percent. Similarly, the cost to an average-sized home heating supplier as a result of this change in

assumptions falls from $19,686 to $19,451, or 1 percent.

c. *Impact on Household Investment and Energy Savings.* Changing the installation rate assumptions from 75 percent to 40 percent would result in the number of each measure which is purchased and the corresponding energy savings to be approximately 53 percent of the level calculated for the 75 percent rate. The number of purchases and corresponding energy savings which would occur are listed below for both the 75 percent and 40 percent installation rates.

The impact of this change in the installation rate would reduce costs of operating the RCS Program from $4.925 billion to $4.819 billion. The savings in energy costs over the lifetime of the energy conservation measures installed would be reduced from $52.8 billion to $28.2 billion.

Other comments also expressed the concern that the number of homes for which the domestic solar water heater (DSWH) audit must be offered appears to double or triple as a result of the decision to offer this audit to all households in a region if they cost-effectively displace *any* water-heating fuel. This comment is a correct interpretation of the Proposed Rule and its probable impacts.

Finally, several comments stated that the RA has not considered a scenario of large scale non-participation caused by conservation efforts outside of the RCS Program.

| Measure | Number purchased [1] | Energy savings: 1st year total Btu energy savings $\times 10^9$ | Energy savings: Lifetime total Btu energy savings $\times 10^9$ | Energy savings: 1st year cost ($) savings $\times 10^3$ | Energy savings: Lifetime total cost ($) savings $\times 10^3$ |
|---|---|---|---|---|---|
| **75 Percent Installation Rate** | | | | | |
| R-19 attic insulation | 3,295 | 126,171.81 | 2,523,436.21 | 350,558.67 | 7,011,296.06 |
| Hot water heater jacket | 11,671 | 32,808.34 | 164,041.73 | 120,047.90 | 533,876.01 |
| Clock thermostats | 10,984 | 154,996.32 | 3,099,926.45 | 353,743.00 | 7,074,860.30 |
| R-13 wall insulation | 10,813 | 260,086.17 | 5,201,723.41 | 1,889,273.31 | 37,785,760.35 |
| Electric pilot | 1,155 | 5,313.00 | 53,130.00 | 36,844.50 | 368,445.00 |
| Total | | 579,375.64 | 11,042,257.80 | 2,750,467.38 | 52,794,237.00 |
| **40 Percent Installation Rate** | | | | | |
| R-19 attic insulation | 1,757 | 67,291.63 | 1,345,832.64 | 186,964.62 | 3,739,357.90 |
| Hot water heater jacket | 6,224 | 17,497.78 | 87,488.92 | 64,025.55 | 320,147.66 |
| Clock thermostats | 5,055 | 82,664.70 | 1,653,294.11 | 188,622.93 | 3,773,258.83 |
| R-13 wall insulation | 5,767 | 138,712.62 | 2,774,252.48 | 1,007,612.43 | 20,152,405.52 |
| Electric pilot | 616 | 2,833.60 | 28,336.00 | 19,650.40 | 196,504.00 |
| Total | | 309,006.34 | 5,889,204.16 | 1,466,915.94 | 28,181,673.91 |

[1] Total households installing measures 1980–1985 equals number purchased.

DOE agrees with this comment, but explains that this scenario was not considered in the RA because research indicated that few conservation programs already in existence include either as many energy conservation measures or renewable resource measures as does the RCS Program. Many programs currently in operation include only ceiling or attic insulation and storm windows. For this reason, it is possible that homeowners who have already participated in a program may also be interested in participating in the RCS Program and obtain information which had not been previously available through an existing program. DOE also notes that the RCS Program is complementary to other federal programs, such as tax credits and low-income weatherization.

4. *Comments on the Analysis of Audits*

This section presents the comments on that portion of the Regulatory Analysis which is concerned with the analysis of audits and related costs. The comments and DOE's responses to them follow.

One comment stated that a cost benefit analysis should have been performed on the use of a Class B audit as a prerequisite to a Class A audit.

DOE disagrees with this comment and points out that the legislation requires on-site inspections of the residence. DOE interprets this requirements to mean that no preconditions may be required. Therefore, the DRA therefore did not analyze the impact of the use of a Class B audit as a prerequisite to a Class A audit in the RCS Program.

A second comment stated that audit costs will be higher because some audits will have to be performed nights and weekends and some auditors will be union.

DOE disagrees, and in response clarifies the derivation of the audit cost used in the RA. The audit cost of $25 per audit-hour which was used in the Draft Regulatory Analysis (DRA) includes $9 per hour wage rate for the auditor, an adjustment for overhead and fringe benefits, and funds to cover clerical, administrative, and computer support for the audit. These figures were based on numerous discussions with personnel of utilities which presently have on-site energy audit programs and firms which provide energy audit services. In many cases, the audits which are provided by these utilities and firms are conducted during evening and weekend hours. The audit costs which were used in the DRA therefore already reflect the costs of conducting audits outside of normal business hours.

Several comments were made that the estimated time that it takes to do the audits either individually or collectively are extremely low and do not appear to be based upon any realistic method of estimating nor on any pilot studies or tests, especially with regard to the time required for complying with all the requirements set forth in the Proposed Rule and the non-productive time associated with any occupation, especially one that requires travel and customer contact. In response, it should be noted that, with regard to the regulatory analysis, estimates of the time that it will take to do an audit are consistent with levels of audit detail and auditor skill requirements represented by the audit as specified in the rule. A time analysis had been conducted as support for the estimates used for each of the conservation and renewable resource audits.

The comment has also been raised that the Draft Regulatory Analysis should assume one combined audit rather than two separate audits. This is incorrect—the Draft Regulatory Analysis correctly reflects the Proposed Rule which includes separate renewable resource and conservation audits.

The comment that the Draft Regulatory Analysis does not address the cost effectiveness of solar or wind energy device audits was related to the concern that while certain regions of the country are likely candidates for such audits, the Proposed Rule dictates that all regions must include them. This is incorrect. The Proposed Rule says that audits are required only for "suggested

measures." Those measures to be designated as "suggested" are determined based on cost effectiveness considerations on a state-by-state basis. The Proposed Rule does not dictate that *all* states must include a measure unless these considerations lead to that conclusion.

One comment maintained that the audit burden on a utility is equal to the expected annual net income of some utilities.

Additional research conducted by DOE in response to this comment indicated that figures for annual net income of each of the covered utilities are not readily available. Figures for annual total revenue and annual residential sales for most covered utilities are available, however. These figures indicate that the annual total cost to an average utility amounts to about 0.5 percent of annual total revenue. The annual total cost to an average utility amounts to about 9.5 percent of annual residential sales.

5. *Comments on the Analysis of Impacts on Home Heating Suppliers*

This section addresses the one comment concerning home heating suppliers and presents the corresponding response. The comment states that the response examines the two ways in which home heating suppliers can cover their costs of program participation. One, they may charge the customer directly for these costs as an additional service. Two, while the analysis looks at the impact on homeowners resulting from utility rate increases, it fails to look at the impact on the cost of oil and propane to those homeowners that use those fuels and who buy them from home heating suppliers who have elected to take part in the Program.

DOE's response examines two ways in which home heating suppliers can cover their costs of Program participation. One, they may charge the customer directly for these costs as an additional service. Two, they can cover these costs by raising the cost of fuel to all their customers. The industry is characterized by a large number of firms which are highly competitive with prices within a geographic area differing very little. For this reason, it is most likely that the first method would be used to cover the costs involved. If, however, a home heating supplier did elect to use the second method, the resulting cost of fuel to the customer would increase by just under $70.00 for the five-year period. In other words, the five-year total fuel cost per customer increases by just under $70.00, or approximately 5.4¢ per gallon of fuel.

6. *Comments on the Energy Savings Chapter of the Regulatory Analysis*

Section six addresses the comments concerning the energy savings chapter of the Regulatory Analysis. The comments and corresponding responses are presented in two parts. Part 1 addresses all of the comments concerning the findings in the energy savings chapter. Part 2 addresses all of the comments concerning the calculations used to derive those findings.

a. *Comments on the Findings of the Energy Savings Chapter of the Regulatory Analysis*

This part presents the response to the comments concerning the findings in the energy savings chapter of the regulatory analysis.

One comment stated that the energy analysis fails to estimate how much imported oil is saved under the Program. The comment also states that the energy analysis fails to break down the forms of energy that will be saved.

DOE's response to these comments are as follows. The Program will save all forms of energy used by residential customers. The amount of imported oil actually saved depends on the extent that the energy saved is derived from oil. The amount of energy saved attributable to the percent of homes heated with oil which reduce their consumption is known. Unknown is the amount of electricity saved which is produced by burning oil. Without accurate information, it is not possible to estimate either the amount of imported oil saved or the amount of each form of energy saved. An estimate can be made and was, on the energy saved in terms of energy savings measured in barrels of oil-equivalent, but this is not the same as actual barrels of oil saved or barrels of imported oil saved.

A second comment is that Program costs per unit of energy saved should have been assessed.

In response to this comment, a Program cost per unit of energy is calculated as follows: The lifetime total Btu energy savings under the 7 percent response rate of the RCS program were calculated to be approximately 8.53 quads. One quad is equivalent to about 172 million barrels of oil.* Therefore, 1.47 billion barrels of oil are saved. The total cost of the RCS Program is $14.73 billion, of which $9.8 billion are consumer expenditures, and $4.9 billion are program-operating costs. The total Program cost, including the cost of both program operations and consumer expenditures, is therefore about $10.02 per barrel of oil. The total Program cost per quad ($10^{15}$) Btu saved is approximately $1.73 billion per quad.

Finally, a comment on the findings stated that the RCS Program does not have the potential to limit per-unit energy costs.

DOE disagrees, and responds that in certain limited instances where a utility will be operating close to peak capacity at the time of the RCS Program, the savings incurred under the Program may delay or eliminate the need for expansion. In this case, the per-unit energy cost would be reduced. Additionally, if a utility taps several sources of power (i.e., nuclear and oil), the reduction of energy demand may allow them to rely more heavily on the least expensive fuel source, thereby reducing the per-unit energy cost.

b. *Comments on the Calculations of the Energy Savings Chapter of the Regulatory Analysis*

Part 2 presents the comments and corresponding responses concerning the calculations used to obtain the findings in the energy savings chapter of the RA.

One comment recommended that consideration should be given to varying existing amounts of insulation with different fuel types.

Research by DOE indicates that, at present, there are no data available which present varying existing amounts of insulation with different fuel types. It has been concluded that the only houses which contain superior levels of insulation are electrically-heated homes. Electrically-heated homes comprise 14 percent of the total housing stock. Existing amounts of insulation for the other fuel types are assumed to be approximately the same.

A second comment stated that most houses have more ceiling insulation than assumed.

DOE disagrees with this comment, and points out that the testimony provides no supporting evidence and documentation to substantiate the claim. On the other hand, the levels of insulation used within the RA are drawn from two separate sources, both of which are in agreement. One source is Owens/Corning's past information records. The other source is The Annual Housing Survey for 1974 to 1976 inclusive.

Another comment recommended that the assumed fuel price escalation assumptions should be revised.

DOE agrees, and points out that the RA was originally drafted with the best available National Bureau of Standards (NBS) data. This data included the best available fuel price projections based

* U.S. Department of Energy. *Monthly Energy Review*, July 1979.

upon the escalation assumptions available at that time. Subsequent to the completion of the Draft Regulatory Analysis, NBS published a more complete document titled *Methodology and Technical Support Used in the Economic Analysis of Suggested Energy Conservation Measures for the Residential Conservation Service Program.* The price of fuels was one of the aspects of the analysis that was revised by the new NBS data reflecting the recent unexpected market changes. The major impacts resulting from the incorporation of the updated NBS data is an increase in the per-unit energy cost and Btu savings and a modified list of energy conservation measures chosen for analysis based upon their payback periods. However, it must be noted that these impacts are not solely a result of revised fuel prices. The updated NBS data contained not only revised fuel prices, but a variety of new assumptions and calculation procedures. The cost of energy conservation measures and payback periods were also altered. All of the revisions or a particular combination of these could be responsible for the resulting impacts. For further information and specification, see the appendix for Part 2 of this document.

Several comments stated that no marginal costs or marginal energy savings were considered.

DOE disagrees, and in response, the definition of the marginal, or incremental, analysis is clarified. The baseline calculated in the Regulatory Analysis estimates the level of costs and energy savings resulting from residents installing energy conservation measures if the Program were not in existence. Even without the Program, concerned economically rational consumers would install a certain amount of energy-conserving measures. The baseline costs are those investment expenditures created by these consumers when purchasing measures and having them installed. The baseline energy savings are the savings resulting from the installation of these measures by the consumer. All of the costs and energy savings resulting from the Program are marginal or incremental with respect to this baseline.

Another comment stated that the RA should analyze every measure required by NECPA.

DOE disagrees with this comment and explains that analyzing all the measures would imply that they were all purchased and therefore contribute to the energy savings. This is inconsistent with the assumptions used in the Regulatory Analysis. By assuming all measures will be installed, one would thus overestimate the energy savings resulting from the Program. These assumptions concerning which measures would be installed are based on discussions with numerous utility personnel who have conducted audit programs. Those contacted indicated that, regardless of response rate to the audit, homeowners are very reluctant to purchase any conservation measure which has a payback period of more than six years. They also claimed to have had difficulty in convincing customers to purchase and install measures with payback periods of even three years. It was, therefore, assumed that customers would not install measures with payback periods greater than six years. Since the corresponding energy savings of all measures is not likely to be realized, their analysis would greatly overestimate energy savings realized through the Program.

A comment also stated that energy savings due to air conditioning are not considered.

DOE disagrees, and in responding to this comment, the methodology and analysis in the RA is clarified. Reductions in annual cooling requirements were calculated for all of the energy conservation measures analyzed in the NBS data. Some measures have a negative effect on heating and a positive effect on cooling or vice versa. An example of this is the use of solar film on windows which increases heating requirements and decreases cooling requirements. All effects on cooling requirements caused by the use of the various measures have been taken into account by the NBS data.

Finally, several comments in this part questioned the accuracy of the assumption concerning future household fuel usage. The comment states that the RA should not have assumed that the same percentages of households will use the same fuel in 1985 as in 1976.

DOE disagrees, and explains the reasons for using the existing actual data instead of analyzing alternative scenarios. First, there are a number of uncertainties in determining the fuel prices of oil and gas. There are also uncertainties concerning the future price of electricity due to uncertainties associated with the future of nuclear-generated electricity, and the unknown environmental effects of modifying generating plants to use coal instead of oil.

The relationship between these prices at future dates will determine the percentage of households using these fuels at that date. We believe that future prices will determine the mix of fuel use not past trends. These prices could be changed by unexpected events at any time. These events could encompass such things as a generic nuclear shutdown caused by a change of policy after an accident, an oil embargo, a gas shortage, a long-term coal strike, or a change in policy due to environmental concerns. Projections of future trends done by EIA and the FEA under Project Independence were examined. Of the five scenarios studied, no two were in agreement on future trends and it was therefore decided that the existing real data were the most appropriate.

Concerning the energy savings associated with the renewable resources portion of the program, the comment was made that solar initiative benefits are overestimated. This is true to the extent that the market penetration projections used to estimate energy savings reflect the cumulative impact of the NEA, which includes financial incentive programs. That is, the estimates of the impact of the renewable resources portion of the RCS Program assumed the existence of other solar incentive programs associated with the NEA. The energy savings reported in the Draft Regulatory Analysis are thus optimistic (in that they reflect factors in addition to the RCS Program). The separation of the effects of the solar programs is thus a very complex issue which was not specifically addressed in the Regulatory Analysis.

*7. General Comments*

General comments received on the RA have been subdivided into three categories. These categories are (1) Methodology, (2) Content, and (3) Other. The comments included in each category and their response are presented below.

a. *Methodology*

Public comments categorized under methodology are those comments which address the overall approach of the analysis. These comments and their responses follow.

One comment stated that the RA should include the cost of compliance with all rules.

DOE agrees, and states that the RA does include the cost of compliance with all rules. Some of these costs are incorporated into a specific cost category rather than called out separately. For example, program development and administration costs to participating utilitities include cost of setting up the Program, modifying billing and accounting procedures, and managing the Program's operation.

In another comment, the overall approach of the RA was criticized and a statement was made that the RA should permit individual utilities to assess the

impact on themselves. It was stated that the use of an "average" utility is the wrong approach.

DOE disagrees, and explains that a purpose of the RA is not to permit individual utilities to assess the impact on themselves. Rather, a purpose of the RA is to estimate the overall impact of the program. The use of an approach which is based on an average utility is an appropriate analytical construct to achieve this purpose of the RA.

Another comment related to methodology stated that too few alternative scenarios were considered. In addition, it was stated that the interactive effects of the alternatives analyzed were not considered.

DOE disagrees, and states that the eight sets of alternatives, each with three alternative scenarios, represented the major areas of the rule which was proposed. The ability to allow a larger number of alternatives was limited by the specific requirements of the legislation. The interactive effects of the alternatives were explicitly not considered. The reasons for this are explained in the DRA. See section B–3 of Chapter I, Introduction, pages I–8 to I–10.

Another commentator stated that a least-cost scenario was not considered. No marginal costs or marginal energy savings were considered.

The response to this comment is that the baseline of the RA, to the extent possible, estimates residential energy conservation costs and energy savings in the absence of the RCS Program. The DRA estimates the cost impact of various alternative sets which were considered in the formulation of the NOPR. These show range of costs of implementing the program under alternative rule formulations.

The evaluation of alternatives includes the action of no regulatory activity in those cases where the legislation does not mandate a specific requirement. For example, no regulatory activity was evaluated as an alternative in regard to post-installation inspection and auditor qualification requirements since these provisions are not mandated by legislation. The alternatives evaluated in regard to the audit which is mandated by the legislation consider only the scope of the audit rather than the need for it.

Several comments related to the methodology stated that the impact of inflation should have been considered.

DOE agrees; however, we point out that the figures for wages which are utilized in the RA and in the UCIA are estimated on the basis of being average or representative for the five-year period of the RCS Program, and as such are not inflated for the period.

A comment regarding program benefits was that the analysis fails to take into account the increase in property taxes that would result from the energy-related improvements made under the program. In response, it should be noted that property tax impacts have been found to have potential significance only for renewable resource measures. However, most states offer tax *incentives* for solar installations. Most of these include or are likely in the future to include property tax exemptions for solar measures. The result is that an assessment of the tax implications of the RCS Program would be very complex, with both tax payments and tax savings resulting from renewable resource installations varying from state to state. Therefore, the regulatory analysis has not specifically addressed this issue.

Concerning the assumptions used in the Draft Regulatory Analysis to assess impacts of the conservation portion of the Program, the comment was made that the assumption of a 250-day year does not take into account vacation, sick leave, etc., and that it would be more realistic to assume a 220-day year.

Upon reevaluation of this assumption, DOE agrees that a lower number than 250 would be more accurate (although perhaps not as low as 220). However, a change in the analysis to take the proposed revision into account would only affect the estimated number of employees associated with the RCS Program and not the cost of the Program. This is because the cost of providing employee benefits, such as social security payments as well as sick leave, holiday pay, and vacation time, are already taken into account in the salary and wage estimates used in the analysis.

In response to this comment, salary estimates have been revised, resulting in an upward adjustment to the estimated cost impact of the Proposed Rule for *administrative* functions equal to $879 million. However, there is no change in *audit* costs (representing nearly two-thirds of total are estimated in the DRA program cost). This is because these costs already take auditor overhead fully into account. Because auditor manpower requirements are one of the several sectors where estimates are dependent on the assumed number of days in a year, a change from a 250-day to a 220-day year would increase the required number of auditor-years by 14 percent.

b. *Content*

The second category of general comments is that related to the content of the RA. These comments address those factors taken into consideration in the estimation of impact. These comments on the RA content and their responses follow.

One comment which addressed the RA content stated that it should include a more comprehensive study of existing utility programs.

DOE disagrees, and in response states that the research efforts to this end involved a literature search and personal contact with utilities and firms which have energy audit programs. Through these efforts, information was obtained from approximately 65 utilities, which is more than 20 percent of the 296 utilities covered by NECPA. These data were supplemented by information obtained from about 10 firms which provide energy audit services.

Another comment stated that a severe limitation of the Regulatory Analysis is the stated lack of consideration of small business. Excluding the impact of the Program on small business in the Regulatory Analysis will exclude well over 95 percent of those businesses that are necessary in order for the Program to succeed.

DOE agrees, and responds that small businesses are likely to benefit from the Program. Participation in the Program by small businesses is not required but allowed according to the regulations. Some examples of the benefits of participation are as follows: Home heating suppliers, especially those concerned with customers switching to other fuels, may participate to protect their interests and increase the efficiency of their customers' equipment which will provide greater customer satisfaction with heating oil. Small businesses will also benefit from the opportunity to be listed on the master list. This will allow small businesses such as new contractors to penetrate markets more easily than they could have without the existence of the Program. Business should be increased for these small businesses due to the increased demand for their installation services and products.

Another comment which addresses content stated that the RA should include program development costs.

DOE agrees, and states that program development costs are included in all estimates. These costs are shown for states in the DRA in Tables IIIC–9 through IIIC–12. For utilities and home heating suppliers, an additional one-half year is added to program administration costs to account for program development costs. This is stated in footnotes to the discussion of Tables IIID–16 through IIID–19, IIID–34 through IIID–37, and IIID–52 through IIID–55 for

utilities, and Tables IIID–12 through IIID–15, IIID–27 through IIID–30, and IIID–42 through IIID–45 for home heating suppliers.

The fourth comment being considered relevant to content is that the Draft Regulatory Analysis should analyze the rules published on March 19, 1979, rather than a reference program.

DOE agrees, and in response states that the Draft Regulatory Analysis (DRA) does in fact analyze the rules published on March 19, 1979, by examining what was defined as a reference program and the remaining alternatives. Part 2 of this document clarifies the analysis of the proposed rule. This is accomplished by altering the reference program of the DRA such that those alternatives which did not reflect the proposed rule are replaced by those alternatives which do reflect the proposed rule and which were analyzed in the DRA.

Concerned with the availability of qualified auditors to perform audits under the RCS Program, the comment was made that a covered utility's ability to fully comply with the rules may be constrained by a lack of a sufficient number of trained auditors. Further, it was remarked that the analysis does not fully discuss this constraint.

Although the draft regulatory analysis specifically addressed the issue of auditor training, it did not explicitly consider the problem of a potential shortage of individuals who would attend these sessions and then be available to conduct audits. Thus, the comment that the analysis did not fully discuss this "constraint" is true. However, partially in response to the concern that there may be an insufficient number of individuals sufficiently skilled to be trained as auditors, the rule has been revised to combine the two audits and reduce the level of detail and complexity of the model audit. This single, less detailed audit will require less skilled auditors than would separate conservation and renewable resource audits. The result is that potential problems concerning availability of sufficiently skilled auditors are virtually eliminated.

With regard to treatment of the renewable resource portion of the program in the DRA, several comments were raised. A broad criticism was that there was no effort to estimate the impact of the proposed RCS Program on investment in renewable resource measures and costs to utilities of providing the services required under the renewable resources portion of the program. This is, to a great extent, true. However, both the revised analysis of the Proposed Rule and the final regulatory analysis contain estimates of these impacts. In addition, it was commented that the regulatory analysis does not contain an assessment of the costs or benefits of standards imposed for renewable resource measures. This is true of the Draft Regulatory Analysis. However, the final regulatory analysis contains such an assessment.

c. *Other*

The third category of general comments includes those which address the entire RA and cannot be categorized within the previous categories. These comments and their responses follow.

One comment asked if the findings were ever used in preparing the proposed regulations.

DOE's response to this comment is that the DRA was conducted during the process of writing the proposed rule and served as an aid in selecting the content of the NOPR. Some specific program provisions determined as a result of the findings of the analysis include those related to auditor training requirements, the scope of measures included in the audit, and post-installation inspection requirements.

Another comment suggested that a test period be established in order to assess the real costs of the proposed Program.

DOE disagrees with this comment and states that according to Executive Order 12044, a test period is not required. The Executive Order allows the use of estimated costs for the Regulatory Analysis.

Finally, a comment stated that DOE should redo the DRA before preparing the final rule.

DOE agrees and states that this has been accomplished and comprises Part 2 of the Final Regulatory Analysis (FRA). The FRA will be made available at the time of publication of the final rule.

8. *Comments on the UCIA*

The following comments were received in regard to the UCIA. Their responses follow.

One comment stated that the UCIA devotes disproportionate energy to renewable resources.

DOE believes that this may appear to be true for two reasons. First, the development of renewable resource alternatives has a greater potential to impact urban and community areas than do conservation alternatives. Secondly, the analysis of urban and community impacts due to conservation measures is based on the findings of the RA while the corresponding analysis of renewable resource measures takes into account information other than that presented in the RA. Since the UCIA of energy conservation measures is an integral part of the RA it may appear less detailed than that for renewable resources.

Another comment noted that a bibliography is needed for sections A and B.

DOE's response notes that these bibliographies for Sections A and B are included in the bibliography for Section C. The sources listed in Section C include those which are used solely in the UCIA. Findings of the RA which comprise much of the data used in the UCIA are referenced in the text.

With regard to the methodology employed in assessing the macroeconomic impacts of the Proposed Rule in the Urban and Community Impact Analysis (UCIA), several questions were raised concerning the use of the Bureau of Labor Statistics Input/Output Model. It was remarked that the utility of the model itself is questionable. From the context of the comments, it appeared that the criticism is directed toward the counter-intuitiveness of results produced by the model. In response, it should be noted that the results of an I/O model simulation describe not only direct impacts but the indirect impacts of a change in any input scenario (e.g., RCS Program policy). Because the national economic interactions modeled through the BLS I/O model are complex, intuition can only provide a reliable guide regarding the *magnitude* of impacts but not the *direction* of change. (For example, the relatively small changes in employment estimated for sectors indirectly related to the RCS Program are consistent with intuition.) Thus, this comment is not taken as a valid criticism of the use of the BLS I/O model for purposes of the RCS Program.

In a more specific comment, it was pointed out that the BLS I/O model shows decreases in jobs in the electric utility industry and state and local government enterprises, all of which are directly connected with all phases of the RCS Program. This was used as an example to demonstrate the counter-intuitiveness of model outputs. In response, it appears that the comment is based on a misinterpretation of results produced by the model. These results as explained in the UCIA, reflect only the direct and indirect impacts resulting from the *installation* of renewable resource measures. Thus, other direct impacts, such as those associated with program administration and providing audits are not included in the results referred to in the comment.

An additional comment suggested that, rather than 1963 dollars, 1979 dollars be used to describe the impact of

solar energy on the economy. In agreement, the revised regulatory analysis of the Proposed Rule presents results in terms of 1979 dollars.

Finally, the comment was made that the number of jobs added to administer the renewable resources portion of the Proposed Rule is too high as estimated in the Urban and Community Impact Analysis. More detailed analysis of program costs has yielded results in agreement with this comment. Estimates of program manpower requirements, presented in the revised regulatory analysis of proposed rule impacts, are significantly lower than those presented in the UCIA.

*B. Assessment of Changes to The Proposed Rule*

This part identifies changes which have been made in going from the Proposed Rule to the Final Rule. These changes include clarifications and modifications of the Proposed Rule, and any additions which have been made.

This part is organized by section of the Rule for each section for which changes and/or additions have been made. A qualitative assessment of these changes and/or additions is given for each amended section. Where a change to a given section affects the quantitative estimates as given in the Draft Regulatory Analysis, this impact is identified and quantified.

1. *Section 105. Definitions*

A number of definitions as stated in the Proposed Rule have been clarified and/or modified in the Final Rule (see II.B.).

None of the changes in definitions affect the estimates of Program impact as determined in Part 2 of the Final Regulatory Analysis. A possible exception to this is the change whereby energy-efficiency replacement air conditioners are added to the list of energy conservation measures. To the extent that these measures are installed through the RCS Program, the consumer expenditures on measures and energy savings as a result of the Program are likely to increase. Lack of available data precludes an estimate of either the likelihood or the level of these consumer expenditures or energy savings.

2. *Section 106. Utility Liability*

This section, which was not in the proposed rule, adds the conference report language concerning utility liability. This is not expected to affect Program costs.

3. *Section 205. Procedures for Submission and Approval of State Plans*

Subparagraph (d)(2) of this section has been modified to include a waiver of the hearing requirement for resubmitted plans unless the Secretary determines that the revisions to the original plan are so significant as to require another hearing.

Assessment of the impact of this change indicates that the cost to a particular state will be less under the Final Rule than under the Proposed Rule if that state's plan is disapproved, must be resubmitted, and requires no significant changes. Because the Regulatory Analysis does not estimate the cost of resubmission of state plans, the estimates of impact of the RCS Program on states is not affected by this rule change.

4. *Section 306. Program Announcement*

A number of clarifications or modifications have been made to this section in the Final Rule (see IV.F.).

The Final Rule allows an alternative information program which is equivalent to the Program Announcement as specified. The revised estimates of information costs (discussed in XI.A.) are considered to be an estimate of either alternative. Therefore, this change in the Rule does not affect the estimates of information costs to covered utilities and home heating suppliers.

The conditional offer to audit provision in the Final Rule allows utilities some flexibility in providing audits so that utility resources which are required to implement the RCS Program may be utilized more evenly and efficiently through out the period of the Program. Because it has been assumed throughout the Regulatory Analysis that utilities would operate in this manner, there is no effect of this change in the Rule on the estimates of either the annual or five-year costs to a utility of average size, or on the estimated aggregate utility costs.

The third and final change in this section of the Rule specifies that information on federal energy tax credits, do-it-yourself installation, and the low-income weatherization program should be included in the Program Announcement. This change in the Rule does not affect the information cost estimates.

5. *Section 307. Requirements for Energy Audits*

A number of changes have been made to this section of the Proposed Rule. These are described in IV.G.

The impact of each of the changes in the audit requirements has been considered and included as part of the estimation of the costs to covered utilities and home heating suppliers. The considerations in recommending these changes include a reduction in the number of skilled auditors, a reduction in the number of auditor training sessions, and a less costly audit. The combined impact of this decision is expected to be a reduction in audit and training costs of nearly $1.0 billion.

6. *Section 308. Arranging Installation*

Changes to Section 308 in the Final Rule are discussed in IV.

The Draft Regulatory Analysis assumes that the utility and home heating supplier role in the arrangement function will consist of more than the distribution of lists. Costs were estimated for this program management function taking into account the fact that the customer would receive assistance in acquiring bids from contractors. Therefore, the additional provisions of the Final Rule are merely a clarification of the minimum arrangement function and represent no additional costs to the Program.

7. *Section 309. Arranging Financing*

Section 309 of the Final Rule is discussed in IV.I. The arrangement of financing, like the arrangement of installation, as it was considered in the Draft Regulatory Analysis, consists of more than the distribution of lists. Costs for arranging financing assume that the utility or home heating supplier will assist the customer in securing a loan upon request. Therefore, the additional provisions of this section of the rule more clearly state the minimum role of utilities and home heating suppliers participating in the Program. Additional Program costs are not expected to occur as a result of this clarification.

8. *Section 310. Accounting and Payment of Costs*

Section 310 of the Final Rule is discussed in IV.J. In the Final Rule billing costs will be added as an administrative and general expense which may be expensed at the discretion of the state regulatory authority.

Research conducted for the Regulatory Analysis indicates that in most cases changes in billing procedures and monthly billing costs resulting from the Program will not be significant. These costs were considered in the estimation of Program impact to utilities.

It has also been recognized that in some cases utilities would incur high costs in order to change their billing systems to meet the requirement that Program charges to customers be

included on their regular utility bills. Since this provision (Section 311) has been changed, participating utilities can use a least cost billing system under the Program.

Since billing costs are expected to be reasonable in most cases and an alternative billing procedure is permitted to allow for the most economical method, it is not expected that utilities will incur any additional cost over and above that estimated as a result of this provision.

9. *Section 311. Billing of Costs, Repayment of Loans and Termination of Service*

The final rule will permit the utility or home heating supplier to bill customers separately for direct Program charges and loan repayment. However, each charge or loan payment must be listed separately on a bill and the customer should be able to submit one payment which would cover RCS charges, loan payments, and utility service.

Utilities which would incur high costs in the process of changing their billing procedures in order to meet the requirement for billing Program costs on the fuel bill should see lower costs and be able to implement a least cost billing method.

10. *Section 312. Lists of Suppliers, Contractors, and Lenders*

This section of the Final Rule is discussed in IV.L. The Final Rule specifies the listing agency be identified and that utilities can, at the states discretion, aid in the compilation of lists. In cases where lists are compiled by the utility, state prepared guidelines must be followed by the utility and the lists will be subject to state review.

This provision is not likely to result in any significant change in Program cost. Some of those cost impacts estimated for state implementation of listing activities will be transferred to the party determined responsible for the activity.

If the cost of the listing activity changes, it is likely to decrease due to more localization of the activity which may result in a decrease of personnel and more direct communication.

The bonding criteria for listing of contractors is not likely to affect Program costs, but is expected to positively impact the quality of installations completed under the Program.

The deletion of the requirement that contractors submit copies of contracts to the utilities will eliminate the potential for contractor complaints in regard to the privacy of a contract between a private firm and a customer. It will also simplify contractor participation in the Program and is therefore likely to increase contractor participation. This change in the rule is not expected to affect Program costs estimated for the preparation and maintenance of master lists.

The final change made to Section 312 of the proposed rule places a time limitation of utility incorporation of changes to the Master Record on utility prepared lists. This additional provision is not expected to affect Program costs.

11. *Section 313. Post-Installation Inspection*

This section of the Final Rule is discussed in IV.M. The random post-installation inspection requirement is reduced by more than one-half in the final Rule. This change in the regulations will result in a decrease of approximately $34.9 million in total Program costs. The estimation procedures used to determine the amount of this decrease are explained below.

The cost of a post-installation inspection is estimated at $35 based on the costs incurred by existing programs which inspect installations for compliance with materials and installation standards. This cost is applied to the total number of inspections to arrive at total Program cost. These costs are shown in the table below.

**Number of Post-Installation Inspections and Costs (Millions) Under the Proposed and Final Rule**

| | Proposed rule | | Final rule | |
|---|---|---|---|---|
| | No. | Cost | No. | Cost |
| Mandatory* | 924,000 | $32.3 | 924,000 | $32.3 |
| Random | 1,167,000 | 40.8 | 170,192 | 5.9 |
| Total | 2,091,000 | 73.1 | 1,094,192 | 38.2 |

*Estimated does not consider inspections which may presently be conducted.

Total estimated post-installation inspection cost of energy conservation measures under the proposed rule is equal to $35 times 2,091,000 inspections, or $73.1 million. Under the final rule, estimated costs are equal to $35 times 1,094,192 inspections, or $38.2 million. This represents a reduction in total program costs of post-installation inspection of energy conservation measures of $34.9 million.

For renewable resource measures, the total post-installation inspection cost under the proposed rule is $7.3 million. This cost includes the requirement that all small wind energy system installations are inspected, that 20 percent of all active and passive solar system installations are insepcted, and that 40 percent of the first 10 installations of active and passive solar systems are inspected.

Under the final rule, the total cost of post-installation inspections of renewable resource measures is $4.8 million. These changes in the final rule represent a reduction of $2.5 million.

12. *Section 314. Qualification of Auditors, Inspectors, and Installers*

This section of the Final Rule is discussed in IV.N.

The elimination of the requirements that the energy auditor have an understanding of the energy overview and that auditors for specific measures only need to be qualified for those measures is expected to lower auditor qualification cost estimates.

13. *Section 315. Complaint Processing Procedures*

Section 315 of the Final Rule is discussed in IV.O. The change to allow handling of consumer complaints by telephone is expected to decrease Program impact. The expenses associated with conducting a conciliatory conference will be eliminated in those cases where a customer complaint can be resolved by telephone.

14. *Section 318. Reporting and Recordkeeping*

This section of the Final Rule is discussed in IV.R. The changes in the reporting and recordkeeping requirements are not expected to significantly change estimated Program costs. Since these changes were made to eliminate overlap and duplicate reporting, any Program implementations costs should decrease by a small margin.

15. *Section 507. Procedure for Obtaining Determination and Waivers*

The Proposed Rule states that all applications for exceptions for existing supply, installation, and financing be filed with the Office of Hearings and Appeals. The Final Rule will state that these applications be filed with the Assistant Secretary for Conservation and Solar Applications.

It is not likely that this change in the Proposed Rule will affect estimated Program impacts.

16. *Sections 904 and 905. Standard Practices for Installation of Insulation*

The proposed rule for the RCS Program included, as a subpart to the installation standard for insulation, a

wiring standard in sections 456.904 and 456.905.

The final rule retracts the wiring standard from the installation standard for insulation. This assessment examines the impacts of this change as follows:

- The real health hazard, according to several contractors with field experience in installing attic insulation is considered to be negligible.
- The participation level of installation contractors in the Program will be heightened.
- Elimination of the wire guard and wiring inspection requirements will reduce the competitive disadvantage of insulation contractors who have to charge for the extra wire guard installation and wiring inspection.
- The cost of the average installation job will be considerably lower. The elimination of these requirements will reduce the cost of a reference program attic retrofit by $120, or 14 percent. These estimates were made for an average home in the Washington, DC area assumed to have R–11 in the attic, no attic ventilation, 1200 square feet of attic area and two recessed lights. The assumed program installation consists of increasing the insulation value to R–30 with blown loose-fill insulation.
- The elimination of the wiring inspection requirement will alleviate a problem expected to have a significant impact. Based on the opinion of a certified safety professional and underwriter with one of the larger insurance firms, it is unlikely that any insurance carrier would offer liability coverage to an insulation installer who was required to conduct electrical inspections unless the installer were a licensed electrician. Therefore, the services of an electrician would be required if the wiring inspection were not eliminated.
- Increased installation costs resulting from procedures and requirements specified by the installation standards will increase cost and also have an inflationary effect on the buildings retrofit industry. The reduction of cost resulting from the wiring standard elimination will help to reduce this effect.
- The program will be more effective because the reduced cost of installation will allow more insulation to be installed by homeowners. Therefore, the benefits of the elimination of the wiring standard outweight the hazards created. This is mainly due to the fact that the hazards do not appear to be significant in the real world outside the laboratory.

17. Appendix I

Appendix I of the Proposed Rule contained suggested energy conservation measures by state, climate zone, and building category. The climate zones specified in the Proposed Rule were a combination of heating and cooling degree days devised by DOE. The building categories examined in the Proposed Rule are gas, oil, and electric heat.

The Final Rule differs from the Proposed Rule in its definition of energy conservation measures, climate zone, and building category. Specifically, the lists of Program measures appearing in the Final Rule will change in the following manner:

- The climate zones are changed to be the same as those of the HUD Minimum Property Standards, as published in the **Federal Register** on April 16, 1979, page 22451. A state may further subdivide its climate zones if it chooses, particularly to take into account variations in air-conditioning usage, insulation, or wind.
- For those measures included in the HUD-MPS, the Final Fule includes Program measures where they are required by the MPS. These are: ceiling, wall, and floor insulation, storm windows, and storm doors.
- The categories of buildings in the Final Rule are identical to those in the Proposed Rule, except that homes with heat pumps have been separated from those with electric resistance heating.
- States and non-regulated utilities may add measures subject to DOE approval. The only additional measures that will be included in the Final Rule are energy efficient replacement air conditioning.

None of these changes are expected to change the impacts estimated in the Regulatory Analysis. These changes will in no way affect the payback period of measures and hence would not change the number of households purchasing measures and subsequent energy savings.

The renewable resource portion of Appendix I has also changed in the following manner:

- Elaborate climate zones for wind have been eliminated. The decision has been made to change the means of aggregating climatic data for wind measures. While considerably simplifying the rule itself, this decision does not affect the estimated Program costs.
- In response to comments, DOE has elected to include an additional passive measure (i.e., window heat gain retardants) within the meaning of "Passive Solar Space Heating and Cooling Systems."

This decision will have essentially no impact on audit cost, and due to the very low cost of the measure, will not significantly affect estimated Program costs.

*C. Summary of The Quantitative Impact of Major Changes To The Proposed Rule*

This part presents a summary of the effects of changes in the rule on the cost of developing and administering the RCS Program. The original estimate of this cost was about $4.9 billion.

Consideration of public comment on the Draft Regulatory Analysis has resulted in a revision of this cost estimate. The revised figure includes additional costs for processing and printing the Program Announcement and burdening the labor costs for arranging and Program management. The revised figure also includes a reduction in post-installation inspection costs as a result of shifting the responsibility from utilities and home heating suppliers to states, as the Rule stated. The revised total cost of developing and administering the RCS Program is about $5.9 billion.

The table below presents a summary of the quantitative impact of major changes in the Rule by cost category. The first column of figures shows the revised estimate of impact of the Proposed Rule by cost category. The second column of figures presents the quantitative impact of the changes to the Rule. The estimates of the impact of the Final Rule is given in the last column. These figures indicate that the changes to the rule have resulted in a decrease in the revised total cost estimate of $997 million, or 16.9 percent.

**Summary of Quantitative Impact of Major Changes in the Proposed Rule**

[In billions of dollars]

| Cost category | Revised estimate* of impact of proposed rule | Impact of changes to proposed rule | Final impact estimate |
|---|---|---|---|
| Arranging Costs | $0.299 | $— | $0.299 |
| Audit Costs | 3.601 | −0.952 | 2.649 |
| Post-Installation Inspection Costs | 0.080 | −0.037 | 0.043 |
| Program Management Costs** | 1.722 | −0.008 | 1.714 |
| Total*** | 5.902 | −0.997 | 4.905 |

* Revised as a result of public comment. See Part A for details.
**Include costs to governments, covered utilities, and participating home heating suppliers for developing and managing the RCS Program.
***Excludes consumer expenditures.

Changes to some installation standards, which are discussed in Part B of this section, will affect the cost of

installation of specific measures. Only one of these changes, that of deleting wiring standards from the standard for installing insulation, can be quantified. The Regulatory Analysis estimated that the standard for installing insulation would result in an increase in the average cost of an installation in the Washington, DC, area by 73 percent, or from $480 with no standard to $830 with the RCS Program proposed standard. Of this additional cost of $350, $120 resulted from the wiring standards. Deletion of the wiring standard, therefore, results in a total cost reduction from $830 to $710, per average installation, or a reduction in the cost of the RCS Program standard from $350 to $230, or 34.3 percent.

**XII. Environmental Impact Statement**

In accordance with the requirements of the National Environmental Policy Act (NEPA) (42 USC 4321 *et seq.*), DOE has undertaken and completed an environmental impact statement on the Residential Conservation Service Program. The Draft Environmental Impact Statement (DEIS) was published in July, 1979, and made available for public comment by notice in the **Federal Register** (July 16, 1979; 44 FR 41208). A public hearing was held on August 14, 1979, at which DOE received both written and verbal testimony on the DEIS. The comment period remained open 45 days, until August 30, 1979. DOE evaluated carefully all comments received relating to the DEIS, both individually and collectively. The comments and DOE's responses to them are set forth in Appendix C to the Final Environmental Impact Statement (FEIS). They are also addressed in the text of the FEIS. The FEIS, which includes an executive summary, may be obtained by writing: Mr. Dan Quigley, Deputy Director, Residential Conservation Service Program, Office of Assistant Secretary for Conservation and Solar Energy, U.S. Department of Energy, 20 Massachusetts Avenue, N.W., Washington, D.C. 20585.

The following discussion sets forth the substantive issues raised by commenters and DOE's treatment of those issues.

*Indoor Air Quality:* The DEIS addressed the potential environmental impacts which might result from decreased indoor air quality caused by measures which reduce air infiltration or exfiltration. The U.S. Environmental Protection Agency (EPA) and several others commented on this subject. The comments were evaluated carefully. The EIS section on indoor air quality has been revised in response to these comments.

A copy of EPA's comments appears in Appendix C of the FEIS. EPA first comment listed several pollutants which could be generated within residential buildings, especially carbon monoxide (CO) and nitrogen dioxide ($NO_2$). EPA requested that the RCS "recognize (these) air quality concerns and take measures to control the concentration of these and other indoor air pollutants." EPA's second comment was a request that Section 456.307 of the Proposed Rule be amended to require auditors to inform customers about the importance of proper ventilation and filtration, particularly: (a) proper ventilation of gas appliances such as space heaters, cooking stoves and clothes dryers; (b) adequate air filtration in residences using forced air heating and cooling systems to reduce particulate levels generated by smoking, cooking or other activities that may result in the suspension of inhalable particles; and (c) the possible use of electrostatic filters which may be more efficient than panel filters in removing particulates as well as airborne viruses, bacteria and pollen grains.

DOE recognizes the seriousness of the potential problems from indoor air pollutants and is continuing a substantial research program on these issues (see Section 3.2.2.1.11 of the FEIS). DOE also heads an inter-agency task force on indoor air quality which includes EPA, the U.S. Department of Housing and Urban Development, the National Bureau of Standards, the Consumer Product Safety Commission and the U.S. Department of Health, Education and Welfare. Reducing infiltration rates in a home may increase concentrations of existing pollutants and may cause potential adverse impacts under certain conditions. Ongoing research will help define the nature and scope of these potential problems more precisely. In the meantime, DOE agrees that additional efforts should be made to address indoor air quality concerns. For example, certain concise statements about proper ventilation can be made that could be vital to reducing potential indoor air pollution hazards. DOE believes that such statements will alert customers to the importance of ventilation without deterring conservation actions. Accordingly, DOE intends to amend the Final Rule in the near future to require auditors to provide specific information on ventilation to customers.

Certain other actions which might help to reduce potential indoor air quality problems are either costly or potentially detrimental to the program. These actions are discussed in Section 3.2.2.1.11 of the FEIS.

EPA's third comment addressed their concern that the standard for the free formaldehyde content of the resin used in urea formaldehyde foam insulation be sufficiently stringent to assure protection of human health in the indoor environment. EPA wished to be sure that DOE had adequately considered the multi-source nature of aldehyde emissions in establishing this standard. DOE has considered carefully the multi-source nature of aldehyde emissions. As a result of DOE's analyses and the work of the interagency group on indoor air quality headed by DOE and including EPA, DOE has decided to revise the urea-formaldehyde material standard in several respects and will reissue it for public comment in the forthcoming notice of proposed rulemaking. This issue is addressed above in "IX Material Standards."

EPA's fourth comment addressed the potential environmental hazards of indoor concentrations of radon and radon daughters, particularly in areas where radium-bearing rock is under or near a house or contained in its building materials. DOE is continuing substantial research on radon to help identify those locations and conditions which may be of concern. Certain geographic locations in Florida, Colorado, and other States have already been identified as having soils and building materials which produce unusually high indoor radon concentrations. DOE will publicly issue program materials to all States, utilities, and any other interested persons to assist them in identifying potential sources of radon which may affect indoor air quality and in carrying out appropriate safeguards. Indoor concentrations of radon and radon daughters are addressed in Section 3.2.2.1.11 of the FEIS.

The fifth section of the EPA comments questioned part of the preamble of the Proposed Rule about attic ventilation. The EPA comment mistakenly assumed that this section of the preamble dealt with indoor ventilation rate and urged DOE to take appropriate action. This latter subject is addressed above in relation to EPA's second comment. Attic ventilation is discussed above in "X. Installation Standards."

EPA's sixth comment urged DOE to recommend procedures to assure proper ventilation as part of its model audit procedures which will be delivered to States as technical assistance. DOE agrees with this suggestion and intends to recommend such procedures to States in the near future to assist them in the development of State Plans.

EPA's seventh comment requested that DOE require that State Plans be developed in coordination with State health agencies. Section 213(a)(6) of NECPA requires that each proposed RCS plan provide procedures to ensure effective coordination with appropriate State, local and Federal energy conservation programs. Moreover, no energy conservation measure may be installed under the RCS program if it violates State or local law, including any health or safety laws. Thus, DOE does not believe it is necessary to mandate additional coordination, since the State Lead Agency will need to confer with appropriate building code or health agencies to assure compliance with State and local laws.

Eight, EPA requested that, in addition to the criteria which thermal insulation products must meet under the Program (such as fire safety and non-corrosiveness), a requirement be added regarding possible air pollution emissions such as formaldehyde emissions. The only kind of insulation of which DOE is aware that has this problem is urea-formaldehyde foam. As mentioned above, DOE will soon publish its proposed revised standard for urea-formaldehyde foam to address this problem. The analysis of formaldehyde and other indoor air pollutants has been revised in Section 3.2.2.1.11 of the FEIS.

Finally, EPA suggested that DOE consider the noise reduction benefits of many conservation measures. DOE recognizes these benefits and intends to discuss them in materials provided to States and other participants.

DOE also requested and received comments on the DEIS from the Lawrence Berkeley Laboratory (LBL), which is performing research on all aspects of indoor air quality under contract to DOE. LBL's comments are reproduced in appendix C of the FEIS. LBL stated that the DEIS seriously understates available indications of the potential impact of (meaures which reduce air infiltration rates) on indoor air quality and, hence, on the health of the occupants, particularly in cases of increased exposure to radon daughters resulting from installation of conservation measures in houses which already have significant radon levels. As noted eariler, DOE has re-evaluated these issues, substantially expanded Section 3.2.2.1.11 of the FEIS and will propose an amendment to the Final Rule to address ventilation, as discussed above in response to EPA's comments.

LBL expressed particular concern about radon concentrations. LBL recommended that what is needed "to avoid substantial increases in radon exposures (as a result of infiltration reduction) is 1) a screening program to identify those areas with unusually high indoor radon levels and 2) specific monitoring of weatherized houses in these areas." DOE agrees with this suggestion and is considering how such a screening and monitoring program could be carried out. DOE believes such a program should be accomplished through cooperative efforts with States, other Federal agencies, utilities, and other interested persons. As noted above, DOE intends to issue program materials to any interested person on these matters.

LBL also commented that indoor air pollutants other than radon required additional analysis. In particular, LBL suggested additional analysis of the indoor formaldehyde issue. Research has shown that elevated formaldehyde concentrations occur in buildings with low ventilation using construction materials of plywood and particle board. DOE has carefully examined other indoor air pollutants and their relationship to air exchange rates. As discussed above in response to EPA's comments, DOE plans to propose an amendment to the Final Rule requiring auditors to provide specific information on ventilation to customers. The discussion of this issue has been expanded in Section 3.2.2.1.11 of the FEIS.

LBL commented that the discussion of heat exchange ventilation systems in the DEIS was too critical of this method of reducing potential indoor air quality problems. LBL pointed to the European countries in which such systems are being installed to control indoor air quality. DOE agrees that ventilation systems may be justified in some circumstances. Section 3.2.2.1.11 of the FEIS has been revised accordingly.

Several other commenters expressed concern about indoor air pollution problems. Mountain Fuel Supply Company, Southwestern Electric Power Company, and Texas Power and Light Company suggested that the attention paid to indoor air pollution concerns was overshadowing the major objectives of energy conservation through infiltration reduction. DOE does not agree with the suggestion that indoor air quality is being emphasized at the expense of energy conservation through infiltration reduction. We believe it wise to address the issue of indoor air quality now to the best of our ability consistent with present knowledge. We also believe that a major and proper emphasis is placed in the program on air infiltration reduction.

In contrast, the American Gas Association, Lawrence G. Spielvogel, Inc., the New York State Department of Public Service, and Public Service Company of Oklahoma (PSCO) questioned whether the DEIS adequately addressed the subject of indoor air quality. Spielvogel requested further consideration of humidity and indoor moisture buildup. PSCO suggested the inclusion of replacement heat pumps would help reduce some sources of indoor air pollutants. As noted previously, DOE has carefully re-examined issues related to indoor air quality. The section in the FEIS on indoor air pollution has been substantially revised (Section 3.2.2.1.11). The information provided in the FEIS incorporates the current state-of-the-art research on these problems. The problems of humidity control are addressed by DOE's vapor barrier standards for installation of insulation, which is discussed above in "X Installation Standards". Additional material has been added to Section 3.2.2.1.11 of the FEIS on the environmental impacts of heat pumps on indoor air quality. Finally, as noted previously, DOE will soon issue a proposed amendment to this Final Rule addressing specific indoor air quality issues.

Public Service Company of Colorado (PSC) raised the concern that many gas heated homes may have faulty heat exchangers or venting systems which result in spillage of combustion products into the living space. PSC noted that tightening houses might increase the rate of spillage in some houses and aggravate air quality problems in homes with existing problems. PSC suggested that each audit of a house include a safety check of the furnace which they estimate could take an average of three hours. PSC also suggested that DOE add a measure to the Program which would require the introduction of air for combustion into a furnace area isolated from the occupied areas of the residence.

DOE agrees that there are houses in which air pollution from faulty furnace systems may be aggravated by infiltration reduction. Additional material on this issue has been added to the FEIS in Section 3.2.2.1.11. Based on existing data, DOE does not believe there is sufficient evidence to warrant a requirement for a full furnace safety inspection or a requirement to add outside combustion air. However, DOE intendes to investigate this potential problem as part of its indoor air quality research program, and will request States and utilities to consider similar investigations. With respect to adding outside combustion air as a measure in

the program, the National Bureau of Standards has concluded that this measure frequently will not reduce energy consumption in houses. DOE has therefore not added it to the program. However, if any State wishes to address these matters in conjunction with its program, the State may propose to do so pursuant to Section 456.319 of the Final Rule.

*Standards:* Several commenters, including the American Gas Association, Lawrence G. Spielvogel, Inc., and Texas Power and Light (TPL) questioned the adequacy of the DEIS in assessing the potential health and safety impact of measures for which either material or installation standards had not been completed (such as vent dampers and electrical ignition systems). Concerns centered on when such standards would be proposed and how information on DOE's decisions to propose standards or withdraw measures would be communicated to the public. New material and installation standards will be proposed shortly as an amendment to this Final Rule and public comments will be solicited in connection with this proposal. DOE will publish the Notice of Proposed Rulemaking, as well as information regarding any decisions it makes concerning the withdrawal of a measure, in the Federal Register.

In contrast to the preceding comments, Peoples Gas Light and Coke Company questioned the need for material and installation standards for conservation measures which they considered safe and well-proven, in particular electrical and mechanical ignition devices. Peoples believed DOE had "overstated" the relationship between health and safety hazards and electric and mechanical ignition systems, emphasizing that similar risks are present with conventional pilot ignition systems and that the possibility of such hazards is extremely remote regardless of the type of ignition system used. While DOE recognizes and is sensitive to differing viewpoints, it has determined independently that standards for safety and effectiveness are necessary for electrical and mechanical ignition devices, and will shortly propose them for public comment. (See "X. Installation Standards," above).

*Fuel switching:* A number of commenters, including Laclede Gas Company, Southwestern Electric Power Company (SWEPCO), and the Public Service of Oklahoma stated either support or opposition to a decision by DOE to include residential fuel switching under the RCS program. These commenters emphasized fuel conversions from gas space heating to heat pumps. In the final rule, DOE has not included fuel-switching as part of the minimum program requirements. However, under Section 456.319 of the Final Rule, States have the discretion to propose the inclusion of State measures in their State plans. DOE requires that the environmental impacts of any proposed State measure be analyzed prior to DOE's approval of such measure. (This subject is discussed in "IV. S. State Measures" and "II. B. Definitions" above.) To ensure that the environmental impacts of proposed State measures are addressed fully, any State proposing such a measure shall be required to analyze its environmental impacts, to publish appropriate public notice and to hold public hearing on the proposed measure as part of the State Plan hearing before submission to DOE. This process will allow full and fair public assessment of any such proposal.

*Air Conditioners:* Two commenters, Dallas Power and Light Company and Texas Power and Light Company, noted that high-efficiency replacement air conditioners hold high potential for energy savings in states with high cooling demand and suggested their consideration as a conservation measure. DOE agrees with these comments and has modified the final rule to require consideration of replacement air conditioners (see "II. B. Definitions" above). The FEIS includes consideration of the environmental impacts of replacement air conditioners (see Section 3.2).

*Program Response Rates:* The American Gas Association stated reservations about "key methodology assumptions needed to assess the potential pollution emissions impacts attributable to the RCS program." AGA argued that this postulated response rate was based upon the assumption that the energy audit would be offered without charge. AGA stated that since the program would "obviously impose a substantial cost burden on gas utilities, it is likely that many States may elect to have customers directly meet the cost of the audit, which could greatly reduce the assumed 35% participation rate to a much smaller figure." While emphasizing the above, AGA suggested a sensitivity analysis of the environmental impacts at rates less than or greater than 7% annually to show possible adverse environmental impacts at those response rates. DOE believes that lower or higher response rates would raise or lower the predicted environmental benefits and potential risks proportionately. Based on the practical experience of existing utility energy conservation programs, DOE believes it is improbable that response rates greater than 7% annually will be achieved. In any event, DOE has analyzed the environmental effects of the Program on individual households and has developed standards based upon that analysis rather than upon any response rate.

*Land Use, Aesthetics, and Wind Systems:* The New York Department of Public Service (NYDPS) questioned whether local zoning and planning procedures would be sufficient to minimize or eliminate land use and aesthetic objections to renewable resource measures, including solar heating and wind energy systems. While present data indicates that local zoning and planning processes should minimize or eliminate these concerns, it is also true that accelerated use of solar and wind systems may cause additional problems. DOE intends to follow developments in those areas and welcomes any information from interested persons. Meanwhile, additional data on this concern has been reflected in Section 7 of the FEIS.

The NYDPS also suggested that the DEIS did not adequately discuss the potential noise impacts of wind systems. DOE believes that the discussion in the FEIS addresses this matter adequately.

*Program Costs:* Several commenters questioned the adequacy of the cost estimates for the RCS program. These questions are addressed in the Preamble section above on the Final Regulatory Analysis.

### XIII. Contractor Contributions to the Rulemaking

The following entities made contributions to the development of the Final Rule for the Residential Conservation Service Program.

1. *Oak Ridge National Laboratory* assisted in the arrangements for public hearings on the Proposed Rule; provided support in summarizing comments received on the Proposed Rule; conducted technical analyses of recommendations for additional measures; provided technical support in developing material standards for energy conservation measures; provided technical analysis for home energy audits; and other general support. In addition, its subcontractors, Hittman Associates, Inc., and Science Applications Inc., provided support in the areas of standards, measures, and audits; and supported the development of the Regulatory Analysis, including the Urban and Community Impact Assessment, and the Environmental Impact Statement.

2. *The Solar Energy Research Institute* assisted in the analysis of public comments on the Proposed Rules; conducted technical analysis of recommendations for additional measures; provided technical analysis for home energy audits; provided technical support in developing standards for renewable resource measures.

3. *The National Bureau of Standards* provided support in the development of energy conservation standards; provided analysis for the development of program measures lists; and assisted in the analysis for home energy audits.

In consideration of the foregoing, the Department of Energy amends Chapter II, Title 10 of the Code of Federal Regulations, by revising Part 456 as set forth below.

Issued in Washington, D.C., on October 30, 1979.

**Maxine Savitz,**

*Acting Assistant Secretary, Conservation and Solar Energy.*

In 10 CFR Part 456, § 456.00 is deleted. Part 456 is revised and consists of Subparts A–I to read as follows:

**Subpart A—General Provisions and Definitions**

Sec.


456.101 Purpose and scope.
456.102 Petitions concerning conflicts of laws.
456.103 Appeals.
456.104 List of covered utilities.
456.105 Definitions.
456.106 Utility and home heating supplier liability.


**Subpart B—Preparation, Submission, and Approval of State Plans and Temporary Programs**


456.201 Scope.
456.202 Initial submission.
456.203 Coordination requirements.
456.204 Notice, comment, and public hearing.
456.205 Procedures for submission and approval of State plans.
456.206 Home heating suppliers.
456.207 Tennessee Valley Authority (TVA).
456.208 Temporary programs.


**Subpart C—Content of State Plans**


456.301 Scope.
456.302 Coverage of State plan.
456.303 Procedures for investigating and enforcing compliance with the State plan.
456.304 Exemptions and waivers for utility supply, installation, and financing.
456.305 Scope of benefits.
456.306 Program announcement.
456.307 Requirements for program audits.
456.308 Arranging installation.
456.309 Arranging financing.
456.310 Accounting and payment of costs.
456.311 Customer billing, repayment of loans, and termination of service.
456.312 List of suppliers, contractors, and lenders.


Sec.


456.313 Post-installation inspection.
456.314 Qualification procedures for auditors, installers, and inspectors.
456.315 Complaints processing procedures.
456.316 Coordination.
456.317 Home heating suppliers.
456.318 Reporting and recordkeeping.
456.319 State measures.


**Subpart D—Nonregulated Utility Plans**


456.401 Scope.
456.402 Coverage.
456.403 Initial submission.
456.404 Coordination requirements.
456.405 Notice, comment, and public hearing.
456.406 Procedures for submission and approval of nonregulated utility plans.
456.407 Temporary programs.
456.408 Content of plans.


**Subpart E—Supply, Installation, and Financing by Utilities**


456.501 Scope and definitions.
456.502 Prohibition.
456.503 Exception for certain measures and small loans.
456.504 Exception for existing supply, installation, and financing.
456.505 Waivers.
456.506 Exception for supply, installation, and financing authorized by State or local law.
456.507 Procedure for obtaining determinations and waivers.
456.508 Appeals.


**Subpart F—Federal Standby Authority and Enforcement Provisions**


456.601 Scope.
456.602 Conditions under which standby authority shall be invoked.
456.603 Standby authority in lieu of State plans.
456.604 Standby authority for nonregulated utilities.
456.605 Failure to comply with orders.
456.606 Enforcement provisions.


**Subpart G—Renewable Resource Installation and Material Standards**


456.701 Scope.
456.702 Solar domestic hot water and active solar space heating systems.
456.703 Thermosiphon hot water heaters [Reserved].
456.704 Swimming pool heaters [Reserved].
456.705 Wind systems material standards [Reserved].
456.706 Wind systems installation standards [Reserved].


**Subpart H—Energy Conservation Material Standards**


456.801 Scope and coverage.
456.802 General requirements and definitions.
456.803 Standards for loose-fill cellulosic or wood fiber thermal insulation.
456.804 Standards for loose-fill mineral fiber thermal insulation.
456.805 Standards for mineral fiber blanket and batt thermal insulation.
456.806 Standards for vermiculite thermal insulation.
456.807 Standards for perlite thermal insulation.


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456.808 Standards for polystyrene thermal insulation board.
456.809 Standards for polyurethane and polyisocyanurate thermal insulation board.
456.810 Standard for urea-formaldehyde based foamed-in-place insulation [Reserved].
456.811 Standards for aluminum foil reflective thermal insulation.
456.812 Standards for caulks and sealants, water heater insulation, and heating/air conditioning duct insulation.
456.813 Standards for storm and thermal windows and doors and multiglazed insulating units for windows and doors.
456.814 Standards for furnace efficiency modifications.
456.815 Load management devices.


**Subpart I—Energy Conservation Installation Standards**


456.901 Scope.
456.902 Referenced standards.
456.903 Definitions.
456.904 Coverage and additional requirements.
456.905 Standard practice for the installation of loose-fill thermal insulation.
456.906 Standard practice for the installation of mineral fiber batts and blankets thermal insulation.
456.907 Standard practice for the installation of organic cellular rigid board thermal insulation.
456.908 Standard practice for the installation of reflective insulation.
456.909 Standard practice for the installation of urea-formaldehyde foamed-in-place insulation [Reserved].
456.910 Certification procedures for the installation of thermal insulation materials.
456.911 Standard practice for the installation of storm windows, thermal windows, multiglazing units and storm doors and thermal doors.
456.912 Standard practice for the installation of insulation on gas-fired, oil-fired, and electric resistance water heaters.
456.913 Standard practice for the installation of replacement oil burners.
456.914 Standard practice for the installation of vent dampers and electric ignition devices [Reserved].

Appendix A to Subpart I—Steady State Efficiency

Appendix I to Part 456—Program Measures

Appendix II to Part 456—Standards incorporated by Reference


**Authority:** Part 1 of Title II of the National Energy Conservation Policy Act, Pub. L. No. 95–619, 92 Stat. 3206, *et seq.;* Department of Energy Organization Act, Pub. L. No. 95–91, 91 Stat. 565, *et seq.*, 42 U.S.C. 7101, *et seq.*

## Subpart A—General Provisions and Definitions

### § 456.101 Purpose and Scope.

This part contains the regulations to implement Part I of Title II of the

National Energy Conservation Policy Act, Pub. L. No. 95–619 (references to NECPA hereinafter refer to Part 1 of Title II of the Act). NECPA requires the establishment of utility programs to encourage and facilitate the installation of energy conservation measures and renewable resource measures.

**§ 456.102 Petitions Concerning Conflicts of Laws.**

(a) A utility making a petition required by a State Plan, a Nonregulated Utility Plan, or a Federal Standby Plan to determine whether the utility:

(1) Is prohibited by a State or local law or regulation from taking any action required to be taken under NECPA or any rule or Plan promulgated pursuant to NECPA, or

(2) Is required or permitted by a State or local law or regulation to take any action prohibited by NECPA or any rule or Plan promulgated pursuant to NECPA,

Shall file the petition with the Assistant Secretary for Conservation and Solar Energy, Department of Energy, 20 Massachusetts Avenue, N.W., Washington, D.C. 20545. Any such petition shall contain a copy of the applicable State or local laws or regulations and a description of the action the utility believes it is prohibited from taking or is permitted or required to take under such laws or regulations.

(b) The Assistant Secretary shall give notice of the petition to the Governor, State Energy Office, and State Regulatory Authority of the applicable State and such other persons as the Assistant Secretary deems appropriate. Any such person or entity may file comments with the Assistant Secretary with respect to such petition within 30 days of receipt of the notice.

(c) If the Assistant Secretary determines pursuant to such petition that a State or local law or regulation prohibits a utility from taking any action required to be taken under NECPA or any rule or plan promulgated pursuant to NECPA or permits or requires a utility to take any action prohibited by NECPA or any rule or plan promulgated pursuant to NECPA, the Assistant Secretary shall issue an order superseding such State or local laws or regulations to the extent inconsistent with NECPA or any rule or plan promulgated pursuant to NECPA. Such an order shall be effective with respect to all utilities otherwise subject to such State or local laws or regulations and shall moot any outstanding petitions under this Section by such utilities.

**§ 456.103 Appeals.**

(a) Any person aggrieved by any order, finding, or determination made under §§ 456.102, 456.502–456.505 may appeal that order, finding, or determination in accordance with Subpart H of Part 205 of these rules.

(b) Any person so aggrieved has not exhausted his administrative remedies until an appeal has been filed under that subpart and an order granting or denying the appeal has been issued.

**§ 456.104 List of covered utilities.**

(a) Before the beginning of each calendar year, the Department of Energy shall publish in the Federal Register a list of all covered utilities for that calendar year.

(b) Not later than 60 days after publication of the list, each State Regulatory Authority shall forward to the Assistant Secretary a copy of such list with designations as to which utilities on the list are under the jurisdiction of that Regulatory Authority.

(c) The publication of the list is for informational purposes, and the failure to include a covered utility on the list or the failure of a State Regulatory Authority to designate a utility subject to its jurisdiction in no way affects the duties of or requirements upon such covered utility under these rules or any plan promulgated pursuant to these rules.

**§ 456.105 Definitions.**

For purposes of this Part:

(a) *Assistant Secretary.* The term "Assistant Secretary" means the Assistant Secretary for Conservation and Solar Energy of the U.S. Department of Energy.

(b) *Class B Energy Audit.* The term "Class B Energy Audit" means an energy audit in which the estimates of costs and savings associated with the installation of program or State measures are based on information collected by an eligible customer about his or her residential building and sent to a covered utility or participating home heating supplier for analysis.

(c) *Covered Utility.* The term "covered utility" means in any calendar year a public utility which during the second preceding calendar year had either:

(1) Sales of natural gas for purposes other than resale which exceeded 10 billion cubic feet, or

(2) Sales of electric energy for purposes other than resale which exceed 750 million kilowatt-hours.

(d) *Eligible Customer.* The term "eligible customer" means a person who:

(1) Owns or occupies a residential building; and

(2) Receives a fuel bill from a covered utility or participating home heating supplier for fuel used in such residential building.

(e) [Reserved.]

(f) *Energy Conservation Measures.* The term "energy conservation measures" means the following measures in a residential building:

(1) *Caulking.* The term "caulking" means pliable materials used to reduce the passage of air and moisture by filling small gaps including (i) at fixed joints on a building, (ii) underneath baseboards inside a building, (iii) in exterior walls at electric outlets, (iv) around pipes and wires entering a building, and (v) around dryer vents and exhaust fans in exterior walls. Caulking includes, but is not limited to, materials commonly known as "sealants," "putty," and "glazing compounds."

(2) *Weatherstripping.* The term "Weatherstripping" means narrow strips of material placed over or in movable joints of windows and doors to reduce the passage of air and moisture.

(3) *Furnace Efficiency Modifications.* The term "furnace efficiency modifications" means:

(i) *Replacement Furnaces or Boilers.* The term "replacement furnaces or boilers" means a furnace or boiler, including a heat pump, which replaces an existing furnace or boiler of the same fuel type and which reduces the amount of fuel consumed due to an increase in combustion efficiency, improved heat generation or reduced heat losses.

(ii) *Furnace Replacement Burner (Oil).* The term "furnace replacement burner (oil)" means a device which atomizes the fuel oil, mixes it with air, and ignites the fuel-air mixture, and is an integral part of an oil-fired furnace or boiler including the combustion chamber, and which because of its design, achieves a reduction in the oil used from that used by the device which it replaces.

(iii) *Flue Opening Modification.* The term "flue opening modification" means an automatically operated damper installed in a gas-fired furnace (often called a vent damper) which:

(A) Is installed downstream from the drafthood; and

(B) Conserves energy by substantially reducing the flow of heated air through the chimney when the furnace is not in operation.

(iv) *Electrical or Mechanical Ignition System.* The term "electrical or mechanical ignition system" means a device which, when installed in a gas-fired furnace or boiler, automatically ignites the gas burner and replaces a gas pilot light.

(4) *Replacement Central Air Conditioner.* The term "replacement

central air conditioner" means a central air conditioner which replaces an existing central air conditioner of the same fuel type and which reduces the amount of fuel consumed due to an increase in efficiency.

(5) *Ceiling Insulation.* The term "ceiling insulation" means a material primarily designed to resist heat flow which is installed between the conditioned area of a building and an unconditioned attic. Where the conditioned area of a building extends to the roofs, the term "ceiling insulation" also applies to such material used between the underside and upperside of the roof.

(6) *Wall Insulation.* The term "wall insulation" means a material primarily designed to resist heat flow which is installed within or on the walls between conditioned areas of a building and unconditioned areas of a building or the outside.

(7) *Floor Insulation.* The term "floor insulation" means a material primarily designed to resist heat flow which is installed between the first level conditioned area of a building and an unconditioned basement, a crawl space, or the outside beneath it. Where the first level conditioned area of a building is on a ground level concrete slab, the term "floor insulation" also means such material installed around the perimeter of or on the slab. In the case of mobile homes, the term "floor insulation" also means skirting to enclose the space between the building and the ground.

(8) *Duct Insulation.* The term "duct insulation" means a material primarily designed to resist heat flow which is installed on a heating or cooling duct in an unconditioned area of a building.

(9) *Pipe Insulation.* The term "pipe insulation" means a material primarily designed to resist heat flow which is installed on a heating or cooling pipe in an unconditioned area of a building.

(10) *Water Heater Insulation.* The term "water heater insulation" means a material primarily designed to resist heat flow which is suitable for wrapping around the exterior surface of the water heater casing.

(11) *Storm Window.* The term "storm window" means a window or glazing material placed outside or inside an ordinary or prime window, creating an air space, to provide greater resistance to heat flow than the prime windows alone.

(12) *Thermal Window.* The term "thermal window" means a window unit with improved thermal performance through the use of two or more sheets of glazing material affixed to a window frame to create one or more insulated air spaces. It may also have an insulating frame and sash.

(13) *Storm or Thermal Door.* The term "storm or thermal door" means:

(i) A second door, installed outside or inside a prime door, creating an insulating air space,

(ii) A door with enhanced resistance to heat flow through the glass area by affixing two or more sheets of glazing material, or

(iii) A prime exterior door with a R-value of at least 2.

(14) *Heat Reflective and Heat Absorbing Window or Door Material.* The term "heat reflective and heat absorbing window or door material" means a window or door glazing material with exceptional heat-absorbing or heat-reflecting properties; or reflective or absorptive films and coatings applied to an existing window or door which thereby result in exceptional heat-absorbing or heat-reflecting properties.

(15) *Devices Associated with Electric Load Management Techniques.* The term "devices associated with electric load management techniques" means customer-owned or leased devices that reduce the maximum kilowatt demand on an electric utility and which are either:

(i) Part of a radio, ripple or other utility controlled load switching system on the customer's premises;

(ii) Clock-controlled load switching devices;

(iii) Interlocks, and other load-actuated, load-limiting devices; or

(iv) Energy storage devices with control systems.

(16) *Clock Thermostat.* The term "clock thermostat" means a device which is designed to reduce energy consumption by regulating the demand on the heating or cooling system in which it is installed, and uses:

(i) A temperature control device for interior spaces incorporating more than one temperature control level, and

(ii) A clock or other automatic mechanism for switching from one control level to another.

(g) *Energy Conserving Practices:* The term "energy conserving practices" means:

(1) *Furnace Efficiency Maintenance and Adjustments,* which means cleaning and combustion efficiency adjustment of gas or oil furnaces, periodic cleaning or replacement of air filters on forced-air heating or cooling systems, lowering the bonnet or plenum thermostats to 80° F. on a gas or oil forced-air furnace, and turning off the pilot light on a gas furnace during the summer;

(2) *Nighttime Temperature Setback,* which means manually lowering the thermostat control setting for the furnace during the heating season to a maximum of 55° F. during sleeping hours;

(3) *Reducing Thermostat Settings in Winter,* which means limiting the maximum thermostat control setting for the furnace to 68° F. during the heating season;

(4) *Raising Thermostat Setting in Summer,* which means setting the thermostat control for an air conditioner to 78° F. or higher during the cooling season;

(5) *Water Flow Reduction in Showers and Faucets,* which means placing a device in a shower head or faucet to limit the maximum flow to three gallons per minute, or replacing existing shower heads or faucets with those having built-in provisions for limiting the maximum flow to three gallons per minute;

(6) *Reducing Hot Water Temperatures,* which means manually setting back the water heater thermostat setting to 120° F., and reducing the use of heated water for clothes washing;

(7) *Reducing Energy Use When a Home is Unoccupied,* which means reducing the thermostat setting to 55° F. when a home is empty for four hours or longer in the heating season, turning an air conditioner off in the cooling season when no one is home, and turning a water heater off when a home is vacant for two days or longer;

(8) *Plugging Leaks in Attics, Basements, and Fireplaces,* which means (i) installing scrap insulation or other pliable materials in gaps around pipes, ducts, fans, or other items which enter the attic or basement from a heated space, (ii) installing fireproof material to plug any holes around any damper in a fireplace, and (iii) adding insulation to an attic or basement door;

(9) *Sealing Leaks in Pipes and Ducts,* which means installing caulking in any leak in a heating or cooling duct, tightening or plugging any leaking joints in hot water or steam pipes, and replacement of washers in leaking water valves;

(10) *Efficient Use of Shading,* which means using shades or drapes (i) to block sunlight from entering a building in the cooling season, (ii) to allow sunlight to enter during the heating season, and (iii) to cover windows tightly at night during the heating season; and

(11) Such other low or no cost practices designated by the Governor and approved by the Assistant Secretary in a State Plan which (i) save energy; (ii) do not require the installation of energy conservation or renewable resource measures; and (iii)

do not adversely impact the RCS Program.

(h) *Governor.* The term "Governor" means the Governor or chief executive officer of a State or his designee.

(i) *Home Heating Supplier.* The term "home heating supplier" means a person who sells or supplies home heating fuel (including No. 2 heating oil, kerosene, butane, and propane) to an eligible customer for consumption in a residential building.

(j) *Measures Warranty.* The term "measures warranty" means a manufacturer's or contractor's warranty which certifies that an energy conservation or renewable resource measure will have a useful life of at least three years.

(k) *Nonregulated Utility.* The term "nonregulated utility" means a public utility which is not a regulated utility.

(l) *Nonregulated Utility Plan.* The term "nonregulated utility plan" means a plan developed pursuant to Subpart D of this part.

(m) *Participating Home Heating Supplier.* The term "participating home heating supplier" means a home heating supplier that has elected to participate in a State Residential Conservation Service Plan which includes home heating suppliers.

(n) *Program Announcement.* The term "program announcement" means the Residential Conservation Service Program information and offer of services required to be sent by a covered utility or participating home heating supplier to each eligible customer by § 456.306.

(o) *Program Audit.* The term "program audit" means an energy audit in which the estimates of costs and savings are based on an on-site inspection of the residence of an eligible customer by an auditor qualified according to a State or Nonregulated Utility Plan.

(p) *Program Information.* The term "program information" means the program announcement and any information dissemination activities related to a Residential Conservation Service Program.

(q) *Program Measures.* The term "program measures" means those energy conservation or renewable resource measures which the Assistant Secretary has by rule determined to be appropriate by climatic region and building category and which are found in Appendix I to this part.

(r) *Public Utility.* The term "public utility" means any person, State agency, or Federal Agency which is engaged in the business of selling natural gas or electric energy, or both, to residential customers for use in a residential building.

(s) *Rate.* The term "rate" means any price, rate, charge, or classification made, demanded, observed, or received with respect to sales of electric energy or natural gas, any rule, regulation, or practice respecting any such rate, charge or classification, and any contract pertaining to the sales of electric energy or natural gas.

(t) *Ratemaking Authority.* The term "ratemaking authority" means authority to fix, modify, approve, or disapprove rates.

(u) *Regulated Utility.* The term "regulated utility" means a public utility with respect to whose rates a State regulatory authority has ratemaking authority.

(v) *Renewable Resource Measure.* The term "renewable resource measure" means the following measures in or with respect to a residential building:

(1) *Solar Domestic Hot Water Systems.* The term "solar domestic hot water systems" means equipment designed to absorb the sun's energy and to use this energy to heat water for use in a residential building other than for space heating, including thermosiphon hot water heaters.

(2) *Active Solar Space Heating Systems.* The term "active solar space heating systems" means equipment designed to absorb the sun's energy and to use this energy to heat living space by use of mechanically forced energy transfer, such as fans or pumps.

(3) *Combined Active Solar Space Heating and Solar Domestic Hot Water System.* The term "combined active solar space heating and solar domestic hot water system" means equipment designed to perform both of the functions described in paragraphs (1) and (2).

(4) *Passive Solar Space Heating and Cooling Systems.* The term "passive solar space heating and cooling systems" means systems that make most efficient use of, or enhance the use of, natural forces—including solar insolation, winds, night time coolness and opportunity to lose heat by radiation to the night sky—to heat or cool living space by the use of conductive, convective or radiant energy transfer. Passive solar systems include only:

(i) *Direct Gain Glazing Systems.* The term "direct gain glazing systems" means the use of south-facing (+ or −45° of True South) panels of insulated glass, fiberglass, or other similar transparent substances that admit the sun's rays into the living space where the heat is retained. Glazing is either double-paned, or single-paned equipped with movable insulation.

(ii) *Indirect Gain Systems.* The term "indirect gain systems" means the use of panels of insulated glass, fiberglass or other transparent substances that direct the sun's rays onto specially constructed thermal walls, ceilings, rockbeds, or containers of water or other fluids where heat is stored and radiated.

(iii) *Solaria/Sunspace Systems.* The term "solaria/sunspace systems" means a structure of glass, fiberglass or similar transparent material which is attached to the South-facing (+ or −45° of True South) wall of a structure which allows for air circulation to bring heat into the residence, and which is able to be closed off from the residential structure during periods of low solar insolation.

(iv) *Window Heat Gain Retardants.* The term "window heat gain retardants" means those mechanisms which significantly reduce summer heat gain through South-facing (+ or −45° of True South) windows by use of devices such as awnings, insulated rollup shades (external or internal), metal or plastic solar screens, or moveable rigid insulation.

(5) *Wind Energy Devices.* The term "wind energy devices" means equipment that uses wind energy to produce energy in any form for personal residential purposes.

(6) *Replacement Solar Swimming Pool Heaters.* The term "replacement solar swimming pool heaters" means devices which are used solely for the purpose of using the sun's energy to heat swimming pool water and which replace a swimming pool heater using electricity, gas and other fossil fuel.

(w) *Residential Building.* The term "residential building" means any building used for residential occupancy which:

(1) Is not a new building to which final standards under Sections 304(a) and 305 of the Energy Conservation and Production Act apply;

(2) Has a system for heating, cooling, or both heating and cooling, living spaces; and

(3) Contains at least one, but not more than four, dwelling units. Townhouses and rowhouses in rows of more than 4 separate houses are included in this definition but garden apartment complexes which contain clusters of four apartment units or less are not.

(x) *Residential Conservation Service (RCS) Program.* The term "Residential Conservation Service (RCS) Program" means the program required to be implemented by covered utilities pursuant to an approved State Plan, an approved Nonregulated Utility Plan, or a Federal Standby Plan.

(y) *Secretary.* The term "Secretary" means the Secretary of Energy.

(z) *State.* The term "State" means a State, the District of Columbia, and Puerto Rico.

(aa) *State Agency.* the term "State agency" means a State, a political subdivision thereof, or any agency or instrumentality of either.

(bb) *State Measure.* The term "State measure" means an energy-saving measure which has been approved by the Assistant Secretary in the State Plan pursuant to § 456.319.

(cc) *State Regulatory Authority.* The term "State regulatory authority" means any State agency which has ratemaking authority with respect to the sales of electric energy or natural gas by any public utility (other than by such State agency); except that in the case of a public utility with respect to which the Tennessee Valley Authority has ratemaking authority, such term means the Tennessee Valley Authority.

(dd) *State Plan.* The term "State Plan" means a plan developed pursuant to Subparts B and C of this part.

(ee) *Useful Life.* The term "useful life" means the period of time for which an energy conservation or renewable resource measure is fit for the ordinary purposes for which such measure is used.

**§ 456.106 Utility and Home Heating Supplier Liability.**

A covered utility or home heating supplier that arranges for a lender to make a loan to, or a contractor to perform work for, and eligible customer should not be held liable, by virtue of its role as project manager for the RCS Program, in any cause of action between such customer and such lender or contractor.

## Subpart B—Preparation, Submission, and Approval of State Plans and Temporary Programs

**§ 456.201 Scope.**

This Subpart identifies the responsibilities of the States and the Tennessee Valley Authority (TVA) in the preparation and submission of State Residential Conservation Service Plans, hereinafter referred to as "State Plans," if a State or the TVA chooses to submit a State Plan; the procedures for approval of the State Plan by the Assistant Secretary; and the procedures for submission and criteria for approval of Temporary Programs.

**§ 456.202 Initial Submission.**

If a State intends to submit a State Plan, the Governor or State Agency specifically authorized by State law to submit a State Plan shall submit the following information to the Assistant Secretary:

(a) *Lead Agency.* Within 30 days of the effective date of these rules, the name and address of the State Agency, hereinafter referred to as "Lead Agency," which has principal responsibility for the development of the State Plan. The Lead Agency shall be either:

(1) An Agency designated by the Governor to develop and submit a State Plan; or

(2) A State Agency specifically authorized by law to develop and submit a State Plan.

(b) *Nonregulated Utilities.* Within 30 days of the effective date of these rules, a list of which nonregulated covered utilities, if any, operating in the State will be subject to the State Plan; and

(c) *Home Heating Suppliers.* Within 90 days of the effective date of these rules, whether or not any home heating suppliers will be included in the State Plan.

**§ 456.203 Coordination Requirements.**

(a) *Among States.* The Lead Agency shall, to the extent feasible, coordinate the preparation of the State Plan with any other State which has jurisdiction over any covered utility or participating home heating supplier subject to the State Plan for the purpose of minimizing any inconsistent provisions governing such covered utility or participating home heating supplier.

(b) *Between the Lead Agency and the State Regulatory Authority.* If the Lead Agency is not the State Regulatory Authority, then the Lead Agency shall provide such Authority a copy of the proposed State Plan 30 days prior to the public hearing required by § 456.204.

**§ 456.204 Notice, Comment, and Public Hearing.**

Prior to submission of the State Plan to the Assistant Secretary for approval, the Governor or Lead Agency shall:

(a) *Notice and Comment.* Provide meaningful public notice of the intention of the State to submit a State Plan. To be meaningful, this notice shall, at a minimum:

(1) Appear in newspapers of general circulation published in the State;

(2) Indicate where a copy of and information pertaining to the proposed State Plan can be obtained;

(3) Indicate the date, time, and location of each public hearing to be held pursuant to Subsection (b) at least 30 days prior to such hearing; and

(4) Invite public comments on the content of the proposed State Plan, with at least 30 days notice.

(b) *Hearing.* Hold at least one public hearing in the State for the purpose of hearing testimony and receiving comments on the content of the proposed State Plan.

**§ 456.205 Procedures for Submission and Approval of State Plans.**

(a) *Who Shall Submit.* Ten (10) copies of the proposed State Plan shall be submitted to the Assistant Secretary by either:

(1) The Governor of the State;

(2) The Lead Agency; or

(3) The TVA with respect to all covered utilities over which the TVA has exclusive ratemaking authority and, in the discretion of TVA, with respect to any covered utility over which the TVA and another State Regulatory Authority have ratemaking authority.

(b) *Time for Submission.* The proposed State Plan shall be submitted within 180 days of the effective date of these rules. The time for submission may be extended by the Assistant Secretary if:

(1) The Governor or Lead Agency requests an extension at least 10 days prior to the formal deadline; and

(2) Good cause is shown for allowing an extension.

(c) *Approval.*

(1) If a proposed State Plan meets the criteria of Subparts B and C of this Part, the Assistant Secretary shall approve it within 90 days of the date the proposed State Plan was submitted.

(2) Within 210 days after the date of approval of a State Plan, the Lead Agency shall provide to the Assistant Secretary a statement certifying whether or not all covered utilities and home heating suppliers subject to the State Plan are in compliance with the State Plan.

(3) The Lead Agency shall, within 30 days of approval of the State Plan:

(i) Inform covered utilities subject to the State Plan and participating home heating suppliers of the contents of the State Plan;

(ii) Direct such covered utilities and participating home heating suppliers to comply with the State Plan; and

(iii) Inform such covered utilities and participating home heating suppliers of the State and Federal procedures for investigating and enforcing compliance with the State Plan.

(d) *Disapproval.*

(1) If a proposed State Plan does not meet the criteria of Subparts B and C of this Part, the Assistant Secretary shall, within 90 days of the date the proposed State Plan was submitted, disapprove the proposed State Plan in writing and shall specify in writing the grounds for disapproval.

(2) Within 60 days of the date of disapproval of a proposed State Plan, or such longer period as the Assistant

Secretary may determine pursuant to the criteria of Subsection (b), the Governor or Lead Agency may submit another proposed State Plan. Except for the time in which a proposed State Plan must be submitted and the requirement for notice, comment, and public hearing, all procedures of this Subpart for submission of the original proposed State Plan shall be applicable to the submission of any proposed State Plan submitted after initial disapproval. The Assistant Secretary may, in disapproving a State Plan, require that the notice, comment, and public hearing requirements be complied with prior to resubmission.

(e) *Amendments.*

(1) The Governor or Lead Agency may submit proposed amendments to an approved State Plan at any time.

(2) Except for the time in which a proposed State Plan must be submitted, all procedures of this Subpart for submission of the original State Plan shall be applicable to the submission of proposed amendments to any approved State Plan.

**§ 456.206 Home Heating Suppliers.**

If the Governor or Lead Agency submits a plan applicable to home heating suppliers in the State, it shall be a part of the State Plan and shall be submitted in accordance with the procedures of this Subpart applicable to the submission of the State Plan.

**§ 456.207 Tennessee Valley Authority (TVA).**

In this part, except as otherwise specified, references to the Lead Agency shall be deemed to refer also to the TVA and references to the State Plan shall be deemed to refer also to the TVA Plan. References in this Part to a State as a geographic area shall, with respect to the TVA Plan, be references to the service areas of the covered utilities subject to the TVA Plan. Reference in this part to a State as a governmental entity (other than references to State laws or regulations) or to any State Agency or officer shall be deemed to refer also to the TVA. If the TVA chooses to submit a Residential Conservation Service Plan, it shall be subject to the following exceptions and additional requirements:

(a) *Exclusion from Initial Submission.* The TVA need not submit the Initial Submission as required in § 456.202. However, within 30 days after the effective date of these rules, the TVA shall notify the Assistant Secretary of the person(s) in charge of its Residential Conservation Service Program and shall submit to the Assistant Secretary a list of which covered utilities will be subject to its Plan.

(b) *Coordination Requirement.* The TVA shall coordinate its Residential Conservation Service Plan with each State Plan developed by a State in which the utilities covered by the TVA Plan are located.

(c) *Exclusion of Home Heating Suppliers.* The TVA Plan shall not cover home heating suppliers.

**§ 456.208 Temporary Programs.**

(a) *Definition of Temporary Program.* A Temporary Program is a plan or a part of a State Plan which exempts in whole or in part for a specified period, to be determined by the Assistant Secretary, but not to exceed three years from the date of approval of such Temporary Program, one or more utilities from one or more of the following provisions:

(1) The requirements for preparing and distributing the Program Announcement described in § 456.306;

(2) The requirements for offering and performing audits described in § 456.307;

(3) The requirements for offering and arranging installation of program measures described in § 456.308;

(4) The requirements for offering and arranging financing for the sale or installation of program measures described in § 456.309;

(5) The requirements concerning accounting and payment of costs described in § 456.310;

(6) The requirements regarding billing of costs, repayment of loans, and termination of service described in § 456.311;

(7) The requirements for distributing the lists described in § 456.312(c); and

(8) The prohibition against supplying, installing, or financing by covered utilities described in § 456.502(a).

(b) *Who May Submit.* A proposed Temporary Program may be submitted to the Assistant Secretary by either:

(1) The Governor of a State;

(2) A covered utility which is included in a State Plan with the support of the Governor; or

(3) A nonregulated utility not included in a State Plan.

(c) *Time for Submission.* A proposed Temporary Program shall be submitted to the Assistant Secretary within 180 days of the effective date of these rules.

(d) *Approval.*

(1) The Assistant Secretary shall approve or disapprove a proposed Temporary Program within 90 days of receipt of the proposed Temporary Program or later if he so notifies the person who submitted the proposed Temporary Program.

(2) The Assistant Secretary may approve a Temporary Program for a period not to exceed three years from the date of approval.

(3) Approval shall be conditioned upon periodic review by the Assistant Secretary to determine whether the grounds for approval still exist. Upon determination by the Assistant Secretary that such grounds for approval no longer exist, the Temporary Program shall be terminated.

(e) *Criteria for Approval.* The Assistant Secretary shall approve a proposed Temporary Program only if the person submitting the proposed Temporary Program demonstrates to the Assistant Secretary's satisfaction that the Temporary Program:

(1) Contains adequate procedures to assure that each covered utility under such program will charge fair and reasonable prices and rates of interest to its eligible customers in connection with the purchase and installation of residential energy conservation and renewable resource measures;

(2) Contains adequate procedures for preventing unfair, deceptive, or anticompetitive acts or practices affecting commerce which relate to the implementation of such program;

(3) Is likely to result in the installation of all program measures in at least as many residential buildings as would have been installed had such utility not been exempt from the requirements for which exemption is sought; and

(4) Contains a provision for submitting such periodic reports as the Assistant Secretary may require.

(f) *Federal Standby Authority.* The Federal Standby Authority described in Subpart F shall not be exercised with respect to a covered utility which either:

(1) Is subject to an approved Temporary Program;

(2) Is proposed for inclusion under a proposed Temporary Program which has been submitted in accordance with Subsection (c), but has not yet been approved or disapproved by the Assistant Secretary; or

(3) Was subject to an approved Temporary Program which has terminated and such covered utility will be subject, within a reasonable time, to be determined by the Assistant Secretary, to an adequately implemented approved State or Nonregulated Utility Plan.

## Subpart C—Content of State Plans

**§ 456.301 Scope.**

This subpart prescribes the minimum requirements for the content of State Plans. The State may include additional information and provide additional requirements in the State Plan for the Residential Conservation Service

Program is such information and requirements are not specifically prohibited by these rules or by any applicable law or regulation. All references in this Subpart to covered utilities apply to regulated and nonregulated covered utilities subject to the State Plan.

**§ 456.302 Coverage of State Plan.**

(a) *Regulated Utilities.* All regulated utilities providing utility service in a State which meet the definition of "covered utility" in § 456.105(c) shall be subject to the State Plan and shall be identified in the State Plan.

(b) *Nonregulated Utilities.* The State Plan shall identify which nonregulated covered utilities, if any, are covered under the State Plan.

(c) *Home Heating Suppliers.* The State Plan shall state whether or not it includes a Residential Conservation Service Program for home heating suppliers.

(d) *Temporary Programs.* The State Plan shall identify the covered utilities, if any, for which a request for any Temporary Program provision has been submitted and describe or attach such provision for each such utility.

**§ 456.303 Procedures for investigating and enforcing compliance with the State Plan.**

(a) *Investigation and Enforcement.*

(1) The State Plan shall require each covered utility and each participating home heating supplier to comply with the State Plan.

(2) The State Plan shall contain adequate procedures for investigating and enforcing compliance with the State Plan by covered utilities and participating home heating suppliers.

(3) The State Plan shall cite and describe the existing or proposed State authority(ies) for such investigation and enforcement, including authorities with respect to any nonregulated utility covered in the State Plan.

(4) The State Plan shall identify the State agency(ies) responsible for such investigation and enforcement and shall include a description of the resources available for such investigation and enforcement.

(b) *Conflicts of Laws.* The State Plan shall require each covered utility to petition the Assistant Secretary in accordance with § 456.102:

(1) Whenever the utility believes it is prohibited by a State or local law or regulation from taking any action required to be taken under NECPA or any rule or State Plan promulgated pursuant to NECPA; or

(2) Whenever the utility believes it is required or permitted by a State or local law or regulation to take any action prohibited by NECPA or any rule or State Plan promulgated pursuant to NECPA.

**§ 456.304 Exemptions and Waivers for Utility Supply, Installations, and Financing.**

The State Plan shall:

(a) Require that each covered utility which supplies, installs, or finances any energy conservation or renewable resource measure pursuant to §§ 456.503–456.505 be listed as a supplier, installer or lender, as appropriate, pursuant to § 456.312 in the same manner and subject to the same requirements as any other supplier, installer, or lender.

(b) Contain a list of all covered utilities engaged in supplying, installing, or financing energy conservation or renewable resource measures pursuant to § 456.506, including with respect to each such utility a specific description of those supply, installation, or finance activities.

(c) Specifically describe how each covered utility listed in Subsection (b) will comply with the requirements of the State Plan mandated by this Subpart in light of the exemption in § 456.506(b).

(d) Contain procedures to ensure that covered utilities which supply, install or finance the sale or installation of energy conservation or renewable resource measures pursuant to §§ 456.503–456.505 shall:

(1) Charge fair and reasonable prices and interest rates, which shall be determined by periodic review of comparative prices and interest rates by a State designated agency;

(2) Not discriminate unfairly among eligible customers; and

(3) When financing energy conservation or renewable resource measures, not discriminate unfairly among suppliers, among contractors, or among measures.

**§ 456.305 Scope of Benefits.**

(a) The State Plan shall describe what action by an eligible customer shall entitle such customer to the following benefits:

(1) The measures warranty defined in § 456.105(j) with respect to any program or State measure except caulking and weatherstripping;

(2) Supply or installation of a measure subject to the standards in Subparts G, H, or I;

(3) Enforcement of standards through the mandatory inspections described in § 456.313 (a) and through inclusion in the pool from which random inspections will be made pursuant to § 456.313(b);

(4) Billing of costs and repayment of loans as described in § 456.311;

(5) Access to the conciliation conference and redress procedures described in § 456.315; and

(6) The requirements placed on suppliers, lenders, and contractors by § 456.312(b).

(b) At a minimum the benefits in subsections (a)(1)–(5) and of the requirements placed on contractors by § 456.312(b)(1) shall be available to each eligible customer when a covered utility or participating home heating supplier arranges installation of any program measure or State measure in such customer's residence pursuant to § 456.308.

(c) At a minimum the benefits in subsections (a) (4) and (5) and of the requirements placed on lenders by § 456.312(b)(3) shall be available to each eligible customer when a covered utility or participating home heating supplier arranges financing, pursuant to § 456.309, for the purchase or installation of any program or State measure installed in such customer's residence.

(d) At a minimum, the benefits in subsections (a)(1), (4), and (5) and of the requirements placed on suppliers by § 456.312(b)(2) shall be available to each eligible customer who purchases any program measure from a listed supplier who indicates that the measure meets applicable RCS program material standards or carries the measures warranty defined in § 456.105(j).

**§ 456.306 Program Announcement.**

(a) *Distribution and Content.* The State Plan shall require each covered utility and each participating home heating supplier to send to each eligible customer, no later than six months after approval of the State Plan and every two years thereafter until January 1, 1985, a Program Announcement which shall, at a minimum:

(1) List the program measures and, if any, the State measures for the category of residential buildings owned or occupied by such eligible customer;

(2) Include a reasonable estimate (or range of estimates) of the savings, in energy costs, expressed in dollars or in percentages, for a specified period of time, which are likely to result from installation of each of the program measures and any State measures in a typical building or buildings in such category;

(3) List the energy conserving practices and state that they are of low or no cost;

(4) Include a reasonable estimate (or range of estimates) of the savings in energy costs, expressed in dollars or in percentages, for a specified period of time, likely to result from the adoption

of the practices, individually or as a group;

(5) For each of the services required to be offered under §§ 456.307 (Program Audits), 456.308 (Arranging Installation), 456.309 (Arranging Financing), and 456.312(c) (List Distributed to Eligible Customers):

(i) Offer and describe the service. The offer of the program audit may be conditioned upon a nondiscriminatory and reasonable factor such as serving one geographic area at a time or serving a certain type of energy user first. At a minimum, the State Plan shall contain procedures to assure that all customers who receive a conditional offer of a program audit are recontacted and receive an unconditional offer of a program audit within two years of receiving the conditional offer;

(ii) Explain how the eligible customer may request the service; and

(iii) List the direct cost, if any, of receiving the service.

(6) With respect to the benefits listed in § 456.305(a), describe under what circumstances such benefits may be obtained, including an explanation of any differences in the benefits applicable to any State measures listed in the Program Announcement.

(7) Include the following disclosure or its equivalent:

Energy savings depend on many factors. The estimates contained in this program announcement are based on estimates for typical houses. Your costs and savings will be different if your house is a different size or type, if your family is a different size, or if your energy using habits are different from those we assumed. The energy audit which we offer will provide more specific estimates for your home.

(8) Include a brief explanation of the benefits of the federal energy tax credits.

(9) Include a brief explanation of the benefits of the Weatherization Assistance Program for Low Income Persons, 10 CFR Part 440, and a brief description of who is eligible for such assistance.

(10) Not include any advertising for the sale, installation or financing by any supplier, contractor, or lender (including the covered utility) of any energy conservation measure, renewable resource measure, State measure, or energy conserving practice; however, if the covered utility or participating home heating supplier finances the sale or installation of such measures, the Program Announcement may so state.

(11) Not include any information regarding any product which is not an energy conservation measure, a renewable resource measure, a State measure, or an energy conserving practice.

(b) *Alternative.* The State Plan may contain an alternative requirement for disseminating RCS Program information and offers of services to eligible customers that shall be used instead of the Program Announcement described in subsection (a), if the Assistant Secretary determines that such alternative requirement fulfills the same functions as the Program Announcement in an equivalent manner.

(c) *Category of Residential Buildings.* As used in this section, the term "category of residential buildings" means one of the categories defined in Appendix I of this part.

(d) *Calculation Procedures.* The State Plan shall, with respect to the estimates of the savings included in the Program Announcement:

(1) Describe the procedures by which such estimates shall be made;

(2) Require that such estimates be based on recent prices for fuel and on climate data which are representative of those for the location of each eligible customer; and

(3) Assure that:

(i) If an eligible customer receives two or more Program Announcements from different covered utilities or participating home heating suppliers, the cost and savings estimates required in paragraph (a) of this section are substantially the same; and

(ii) Such estimates in Program Announcements distributed in different parts of the State are consistent. Consistent means substantially the same except for variations in the characteristics of typical homes and in the price and climate data applicable in the different parts of the State.

(e) *New Customers.*

(1) A new customer is a person who becomes an eligible customer after initial distribution of the Program Announcement but before January 1, 1985.

(2) The State Plan shall require that each covered utility and participating home heating supplier send a Program Announcement which meets the requirements of this section to each new customer within 60 days of such customer becoming a new customer.

(3) The State Plan shall require that covered utilities and participating home heating suppliers inform each new customer that upon request the customer may receive a copy of the results of any program audit of the customer's residence which the covered utility or participating home heating supplier may have performed pursuant to the State Plan and require that upon such a request such utility or home heating supplier provide such results.

### § 456.307 Requirements for Energy Audits.

(a) *Timing and Preconditions.*

(1) The State Plan shall specify a reasonable time within which each covered utility and participating home heating supplier shall provide program audits to an eligible customer upon a request for such an audit.

(2) The State Plan shall prohibit covered utilities and participating home heating suppliers from requiring as a precondition of providing a program audit to an eligible customer that such customer purchase or perform any other energy audit, including a Class B energy audit.

(3) The State Plan shall prohibit covered utilities and participating home heating suppliers from discriminating unfairly among eligible customers in providing program audits.

(b) *Content of Program Audit.*

The State Plan shall describe the energy audit services to be offered by covered utilities and participating home heating suppliers and shall require at a minimum that each covered utility and participating home heating supplier provide to each eligible customer a comprehensive program audit which addresses all energy conserving practices and all program measures, upon request by such eligible customer.

(1) The State Plan shall require that in each program audit, the auditor determine which of the energy conserving practices would save energy in the residence, explain such energy conserving practices to the eligible customer, emphasize the importance of these practices, and recommend that they be performed before installation of any measure.

(2) The State Plan shall require that in each program audit, the auditor determine the applicability of each program measure in that residence. If a program measure is not applicable, then the requirements of this section to provide estimates of the cost and savings of installation of such measure in such residence need not apply.

A program measure is applicable in a residence if:

(i) The measure is not already present in the residence;

(ii) Installation of the measure is not a violation of federal, State, or local law or regulation;

(iii) With respect to ceiling insulation, the difference between the effective R-value of any existing insulation and the program measure level for that residence is R–11 or more, and the building is not a mobile home;

(iv) With respect to wind energy devices, the lot is larger than 0.75 acres, there are no major wind obstructions, and a tower can be sited at least 50 feet from a property line or a right-of-way for electrical transmission or distribution lines;

(v) With respect to active solar heating systems, or combined active solar systems, a site exists on or near the residence which is free of major obstruction to solar radiation and the residence has a space heating system other than a steam heating, electric resistance radiant heating, or electric resistance baseboard heating system;

(vi) With respect to active domestic hot water systems, a site exists on or near the residence which is free of major obstruction to solar radiation;

(vii) With respect to flue opening modifications, the furnace combustion air is taken from a conditioned area;

(viii) With respect to replacement furnaces or boilers, the existing furnace is approximately five years old or older;

(ix) With respect to replacement central air conditioners, the residential building has a central air conditioner that is approximately five years old or older;

(x) With respect to water heater insulation, the remaining useful life of the water heater appears to the auditor to be at least three years and space is available around the water heater to install insulation;

(xi) With respect to clock thermostates, either the residence currently has a thermostat or the existing furnace or central air conditioner is compatible with a clock thermostat;

(xii) With respect to replacement solar swimming pool heaters, there is an existing heated swimming pool and a site exists near the part which is free of major obstruction to solar radiation;

(xiii) With respect to wall insulation, there is no insulation in a substantial portion of the exterior walls, and the building is not a mobile home;

(xiv) With respect to floor insulation, no floor insulation is present;

(xv) With respect to direct gain glazing systems and indirect gain systems, the living space of the residence has either a South-facing (+ or −45° of True South) wall or an integral South-facing (+ or −45° of True South) roof, which is free of major obstruction to solar radiation;

(xvi) With respect to solaria/sunspace systems, the living space of the residence has a South-facing ground level wall, which is free of major obstruction to solar radiation;

(xvii) With respect to window heat gain retardants, the living space of the residence has a South-facing (+ or −45° of True South) window that is not shaded from summer sunshine; and

(xviii) With respect to heat absorbing or heat reflective window and door material, the residence has an existing central or room air conditioner.

These applicability criteria may in a State Plan be expanded or restricted, subject to the approval of the Assistant Secretary.

(3) The State Plan shall require that each estimate of energy cost savings and of installation costs provided as a result of a program audit be based on an adequate assessment, including actual measurements or inspections, as appropriate, performed on-site by the auditor, of the building shell and of the space heating, space cooling, and water heating equipment.

(4) The State Plan shall contain procedures to assure that the estimates of energy cost savings and of installation costs and any other economic calculation provided as a result of a program audit shall be based on typical recent local electricity rates, typical recent local fuel prices, typical recent local prices for materials and installation of program measures, and typical local climate data for the eligible customer's location.

(5) The State Plan shall require that the estimates of energy cost savings for active solar space heating systems, solar domestic hot water systems, and combined active solar space heating and solar domestic hot water systems be based on the calculation procedures contained in the HUD Intermediate Minimum Property Standards Supplement, Solar Heating and Domestic Hot Water Systems, 4930.2, 1977 Edition, U.S. Dept. of Housing and Urban Development, or equivalent calculation procedures, included in the State Plan and approved by the Assistant Secretary.

(6) The State Plan shall contain procedures to assure the validity of the program audit with respect to all program measures and shall contain either:

(i) A brief description of the program audit procedures which shall be followed under the State Plan and a detailed description of the method which has been used by the State to assure the accuracy of these procedures; or

(ii) A detailed description of the program audit procedures which shall be followed under the State Plan, subject to the approval of the Assistant Secretary as to their validity; or

(iii) A certification that the State has sought and received the approval of the Assistant Secretary as to the accuracy of the program audit procedures.

For the purposes of this paragraph, the term "program audit procedures" means the measurements or inspections which the auditor must make in a customer's residence and the calculations which must be performed in making energy cost savings estimates.

(7) The State Plan shall require that any cost and savings estimate for any applicable furnace efficiency modification to a gas or oil furnace or boiler be based on an evaluation of the seasonal efficiency of such furnace or boiler. This seasonal efficiency shall be based on estimated peak (tuned up) steady state efficiency corrected for cycling losses. Steady state efficiency shall be derived from manufacturer's design data and observation of the furnace components, or alternatively, by a flue gas analysis of measured flue gas temperature and carbon dioxide content.

(c) *Results of Program Audit.*

The State Plan shall require that the auditor, in person, on site, provide the following information in writing to each eligible customer who receives a program audit upon completion of the audit. If the eligible customer is not present or otherwise declines in-person presentation, the auditor is relieved of any obligation to deliver the results in person. An alternative to the on-site, in-person delivery of audit results required in this subsection may be used if the State Plan demonstrates to the satisfication of the Assistant Secretary that another method of delivery is equally effective in motivating the customer to install measures.

(1) An estimate of the total cost (materials and labor), expressed in dollars or a range of dollars, of installation by a contractor of each applicable program measure addressed in the program audit;

(2) An estimate of the total cost, expressed in dollars or a range of dollars, of installation by the customer of each applicable program measure, other than replacement central air conditioners and wall insulation, addressed in the program audit, except that the State Plan shall prohibit any covered utility or participating home heating supplier from providing any estimate to any eligible customer of the cost of purchase of furnace efficiency modifications, devices associated with load management techniques, or wind energy devices for installation by the eligible customer;

(3) An estimate of the savings in energy costs, expressed in dollars or a range of dollars, which would occur during the first year from installation of

each applicable program measure addressed by the program audit;

(4) Clear indication to the eligible customer, through sample calculation or disclosure, that the total energy cost savings from the installation of more than one program measure may be less than the sum of energy cost savings of each measure installed individually;

(5) The following disclosure or its equivalent: "The procedures used to make these estimates [are consistent with DOE criteria for residential energy audits] or [have been evaluated by the State for accuracy]. However, the actual installation costs you incur and energy savings you realize from installing these measures may be different from the estimates contained in this audit report. Although the estimates are based on measurements of your house, they are also based on assumptions which may not be totally correct for your household."

(6) An estimate of the annual normal maintenance costs, if any, of each applicable program measure;

(7) The possible economic benefits to the eligible customer of existing Federal tax incentives, with, at a minimum, one sample calculation of the effect of the tax benefit on the cost to the customer of installing one applicable energy conservation program measure and one applicable renewable resource program measure;

(8) With respect to a program audit addressing an applicable solar domestic hot water system or active solar space heating system, or combination thereof, a description of the solar system assumed by the auditor in preparing energy savings estimates which shall include the following information:

(i) Square feet of collector;

(ii) Collector characteristics, including glazing materials and other collector materials;

(iii) Any storage system needed, including the capacity of storage;

(iv) Any freeze protection needed;

(v) The estimated percent of the space and/or water heating load to be met by solar energy;

(vi) Any physical connections needed with existing heating systems;

(vii) Any site preparation needed; and

(viii) If the results are based on a simulation, the following disclosure or its equivalent:

"The energy cost savings estimates you receive are based on systems which may be different from the ones you purchase. Also, these estimates were not determined using actual conditions but using simulated measurements. Therefore, the cost savings we have estimated may be different from the savings which actually occur."

(9) With respect to a program audit addressing an applicable passive solar space heating and cooling system:

(i) The generic designation and a pictoral description of the particular system considered by the auditor;

(ii) The estimated percent of the heating load to be met by such system;

(iii) The approximate dimensions of such system;

(iv) Collection storage characteristics, including the recommended heat capacity of storage; and

(v) The disclosure provided in paragraph (8)(viii) of this subsection.

(10) With respect to a program audit addressing an applicable wind energy device:

(i) Installation cost estimates, as required in paragraph (c)(1) of this section, based on commercially available wind devices of a kilowatt rating appropriate to the level of electricity consumption in the customer's residence;

(ii) Estimates of energy cost savings, as required in paragraph (c)(3) of this section, provided in the form of a function of average yearly wind speeds for the system used in paragraph (c)(10)(i) of this section;

(iii) The average yearly wind speed at the nearest wind measurement station and the relationship between that data and the likely wind speeds at the residence; and

(iv) A description of the type of wind energy device used by the auditor in preparing the energy savings estimates.

(d) *Additional Information Required for Program Audits.* The State Plan shall require that the auditor present the following information to the eligible customer during, or upon completion of, the program audit.

(1) An explanation of the benefits and services listed in § 456.305(a), and a brief description of how the eligible customer can qualify for such benefits and services, including an explanation of the difference, if any, between the benefits and services available for program measures and those for any State measures addressed in the audit;

(2) The lists of contractors, suppliers, and lenders developed pursuant to the State Plan for the applicable program measures, at a minimum; and

(3) An explanation of the benefits of the Weatherization Assistance Program for Low Income Persons, 10 CFR Part 440, and a brief description of who is eligible for such assistance.

(e) *Prohibitions and Disclosure Required for Program Audits.*

(1) The State Plan shall prohibit the auditor from estimating, as part of any program audit provided pursuant to the State Plan, the costs or energy cost savings of installing any product which is not an energy conserving practice, a program measure, or a State measure;

(2) The State Plan shall prohibit any auditor from recommending any supplier, contractor, or lender who supplies, installs, or finances the sale or installation of any program or State measure, if such recommendation would unfairly discriminate among such suppliers, contractors, or lenders. If a covered utility or participating home heating supplier which arranged the audit, supplies, installs or finances the sale or installation of program or State measures, the auditor may so state;

(3) The State Plan shall prohibit any unfair discrimination among program measures;

(4) The State Plan shall require that each energy auditor provide the eligible customer with a written statement of any substantial interest which the person or the person's employer has, directly or indirectly, in the sale or installation of any program or State measure.

(f) *Program Audits of Furnaces.* The State Plan shall require that, in order for an auditor of a covered utility or participating home heating supplier to provide cost and savings estimates for furnace efficiency modifications with respect to a furnace which uses as its primary source of energy any fuel or source of energy other than the fuel or source of energy sold by that covered utility or participating home heating supplier, the eligible customer must request such audit by signing a form which includes the following statement:

If your home is heated by a source of fuel other than [state the type of fuel supplied by the covered utility or participating home heating supplier], only the supplier of the other fuel may audit your furnace unless you specifically request us to audit your furnace. Federal law requires that such a request be in writing. If you want us to audit your furnace, although we do not supply the fuel for it, please sign below.

(g) *Qualifications for Program Auditors.* The State Plan shall require that each person who performs a program audit pursuant to the State Plan shall:

(1) Be qualified according to the applicable procedures in § 456.314;

(2) Be under contract or subcontract to, be an employee of, or be an employee of a contractor or subcontractor to, a covered utility or participating home heating supplier.

(h) *Class B Energy Audits.* If the State Plan permits Class B energy audits to be offered in conjunction with the RCS Program, it shall:

(1) Require that Class B energy audits address all energy conserving practices and all program measures;

(2) Require that Class B energy audits explain the energy conserving practices, emphasize the importance of these practices, and recommend that they be performed before installation of any measure;

(3) Require that Class B energy audits meet the requirements for program audits contained in paragraphs (B) (3)–(5) of this section and contain procedures to assure the validity of the audit as provided for in paragraph (b)(6) of this section with respect to program audits. However, in paragraphs (b)(3) and (b)(6) of this section, all references to measurements and inspections by the auditor shall be treated as references to measurements and inspections by the customer;

(4) Require that the Class B audit provide to the eligible customer the same information required as part of a program audit in paragraphs (c) (1)–(10) of this section;

(5) Require that the Class B audit provide to the eligible customer the additional information required as part of a program audit by paragraphs (d) (1) and (3) of this section;

(6) Require that the Class B audit offer the lists of contractors, suppliers, and lenders developed pursuant to the State Plan;

(7) Contain with respect to the Class B audit the same prohibitions required in paragraphs (e) (1)–(3), except that references to the program audit shall be deemed to refer to the Class B audit and references to the auditor shall refer to the entity providing the Class B audit;

(8) Require that the utility providing the Class B audit attempt to contact the eligible customer, by telephone or otherwise, if the information sent by such customer is incomplete or internally inconsistent, in order to attempt to correct or make complete the information.

**§ 456.308 Arranging Installation.**

The State Plan shall:

(a) Require each covered utility and participating home heating supplier to arrange installation of any program measure upon request by any eligible customer;

(b) Describe these arrangement services which shall, at a minimum, include:

(1) A choice to the eligible customer of either receiving assistance from the covered utility or participating home heating supplier in receiving bids for the installation of program measures, or receiving a list of any installers who have agreed to perform installations of program measures at or within the prices estimated in the audit results; or

(2) Any other arranging service described in the State Plan that provides a similar or greater level of service as that described in paragraph (b)(1) of this section.

(c) Require each covered utility and participating home heating supplier to provide such arrangement service within a reasonable period of time, which shall be specified in the State Plan, from receipt of a request for such service;

(d) Prohibit each covered utility and participating home heating supplier, when arranging installation of program measures, from recommending, selecting, or providing information regarding any supplier or contractor if such recommendation, selection, or information would unfairly discriminate among suppliers and contractors of program measures. The State Plan may allow covered utilities or participating home heating suppliers that supply or install program measures to so inform the customer;

(e) Prohibit each covered utility and participating home heating supplier, when arranging installation of program measures, from discriminating unfairly among eligible customers, among suppliers, among contractors, or among program measures; and

(f) Prohibit each covered utility and participating home heating supplier from arranging installation of any program measure with any person not in the Master Record.

(g) Prohibit each covered utility and participating home heating supplier from arranging in conjunction with the RCS Program installation of any measure that is not a program or State measure.

**§ 456.309 Arranging Financing.**

The State Plan shall:

(a) Require each covered utility and participating home heating supplier to arrange financing for the supply and installation of any program measure upon request by any eligible customer;

(b) Describe these arrangement services which shall, at a minimum, include a service to the eligible customer in addition to any other service or benefit required by §§ 456.305 and 456.312(c). This service shall not be accomplished by merely providing customers with information on how to shop for a loan but shall consist of a service to the customer which directly assists such customer in obtaining a loan from an individual lender;

(c) Require each covered utility and participating home heating supplier to provide such arrangement service within a reasonable period of time, which shall be specified in the State Plan, from receipt of a request for such service;

(d) Prohibit each covered utility and participating home heating supplier, when arranging financing for the purchase or installation of program measures, from recommending, selecting, or providing information regarding any lender if such recommendation, selection, or information would unfairly discriminate among lenders that finance the purchase or installation of program measures. The State Plan may allow covered utilities or participating home heating suppliers that finance program measures to so inform the customer;

(e) Prohibit each covered utility and participating home heating supplier, when arranging financing of program measures, from discriminating unfairly among eligible customers, among suppliers, among contractors, among lenders, or among program measures; and

(f) Prohibit each covered utility and participating home heating supplier from arranging financing for the supply or installation of program measures with any lenders not in the Master Record.

(g) Prohibit each covered utility and participating home heating supplier from arranging financing in conjunction with the RCS Program for the supply or installation of any measure that is not a program or State measure.

**§ 456.310 Accounting and payment of costs.**

(a) *Accounting.* The State Plan shall require, and may permit with respect to costs of revenues directly associated with State measures, that covered utilities use the following accounts and procedures:

(1) All amounts expended or received by a covered utility which are attributable to the Residential Conservation Service Program, including any penalties paid under Subpart F (Federal Standby Authority) shall be accounted for on the books and records separately from amounts attributable to all other activities of the covered utility.

(2) Covered utilities subject to the jurisdiction of the Federal Energy Regulatory Commission (FERC) shall utilize the Uniform System of Accounts as prescribed in Title 18, CFR Parts 101, 104, 201 and 204. Covered rural electric cooperatives shall utilize the Uniform System of Accounts as prescribed by the Rural Electrification Administration (REA) in Title 7, CFR Part 1701, Appendix A. Other covered nonregulated utilities shall adopt accounts within their accounting system with the attributes of the appropriate accounts prescribed by the FERC.

(i) All amounts expended by a covered utility for the Residential Conservation Service Program shall be charged to subaccounts within Account 908, Customer Assistance Expenses, its equivalent or successor, or the appropriate account designated specifically by FERC or REA for Residential Conservation Service Program expenses. Appropriate records shall be maintained thereunder so as to allow ready identification of costs attributable to the following program elements:

(A) Program Information; and

(B) Program Audit;

(ii) Billed income attributable to the Residential Conservation Service Program shall be accounted for in subaccounts within Account 456, Other Electric Revenue (for electric utilities) or Account 495, Other Gas Revenues (for gas utilities), their equivalents or successors, or the appropriate account designated specifically by FERC or REA for Residential Conservation Service Program billed income.

(b) *Payment of Costs.* The State Plan shall require that covered utilities treat costs as described below and shall describe how the costs described in paragraph (b) (3)–(5) of this section will be treated.

(1) All amounts expended by a covered utility for the Program Announcement and all public education and program promotion directly related to providing information about a utility's Residential Conservation Service Program shall be treated as a current expense of providing utility service and be charged to all ratepayers of the covered utility in the same manner as other current operating expenses of providing such utility service.

(2) All amounts expended by a covered utility for labor and materials in connection with the purchase or installation of any energy conservation or renewable resource measure shall be charged to the residential customer for whom such activity is performed. (Interest expenses associated with utility loans are to be treated in accordance with paragraph (b)(5) of this section.)

(3) The following program elements are to be treated as a current operating expense consistent with paragraph (1) or be charged to the eligible customer, consistent with paragraph (2), or any combination thereof. This determination shall be made by the State regulatory authority for all regulated utilities covered by the State Plan and individually by each nonregulated utility covered by the State Plan. The costs include:

(i) Administrative and general expenses, including those associated with program audits, list distribution, customer billing services, and "arranging." These administrative costs may include any costs the utility incurs if it conducts random post-installation inspections required by § 456.313(b) and conciliation conferences required by § 456.315(a);

(ii) Project manager requirements, including:

(A) Program audits;

(B) Arranging for a lender to make a loan to an eligible customer to finance the purchase and installation costs of energy conservation and renewable resource measures, including the costs of arranging repayment of the principal and interest of a loan as part of the periodic bill; and

(C) Arranging to have the program measures installed.

(4) Costs incurred by a covered utility for services carried out by such utility on behalf of the State may be reimbursed by the State.

(5) The interest cost on a loan made by a covered utility to an eligible customer and costs, other than those in paragraph (b) (1), (2), or (3), of this section, associated with the covered utility's Residential Conservation Service Program, shall be charged to the eligible customer for whom such activity is performed. *Exception.* These items may be treated as a current expense consistent with paragraph (b)(1) of this section if the State regulatory authority, or the nonregulated utility, as appropriate, finds, after public notice and opportunity for public hearing, that the expensing of these costs is likely to result (by reason of reduction in demand for energy) in lower rates for its ratepayers than would occur if the covered utility did not teat such costs as a current expense.

(c) *Duplication of Audits.* In areas where a residential customer is an eligible customer of more than one covered utility, the State regulatory authority or the covered nonregulated utility, as appropriate, may condition the whole or partial expensing of program audits, in accordance with paragraph (b)(3) of this section, upon the establishment of procedures to ensure that each eligible customer may receive only one free or subsidized audit.

**§ 456.311 Customer Billing, Repayment of Loans, and Termination of Service.**

The State Plan shall require that:

(a) *Customer Billing.*

(1) Every charge to a customer for any portion of the costs of carrying out any activity pursuant to the State Plan or for repayment of a loan made under the Residential Conservation Service Program, shall be listed individually on a bill and the customer shall be permitted to include such payment in his payment for utility or fuel service; and

(2) When any portion of the costs of carrying out any activity pursuant to the State Plan are included in a payment for utility or fuel service, or when repaying a loan made under the RCS Program in a payment for utility or fuel service, payments received for such bill shall be first charged to pay for the purchase of utility or fuel service and only the excess shall be credited to charges for the other costs or repayments, unless the eligible customer requests an alternative distribution of payments.

(b) *Repayment of Loans.*

(1) In the case of any loan made by a covered utility or a participating home heating supplier under the Residential Conservation Service Program, the covered utility or participating home heating supplier shall permit the eligible customer to include repayment of that loan in such customer's payment of his periodic utility or fuel bill over a period of not less than three years, unless the eligible customer chooses a shorter repayment period. A covered utility or participating home heating supplier shall not be required to provide for monthly payments of less than five dollars.

(2) Under the circumstances described in the State Plan pursuant to § 456.305, an eligible customer shall be permitted to include repayment of a loan by a lender other than the covered utility or the participating home heating supplier, in such customer's periodic payment of his utility or fuel bill, if the lender agrees to repayment in such manner.

(3) In the case of any loan for purchase and installation of program measures made by a covered utility or a participating home heating supplier under the Residential Conservation Service Program, or, under the circumstances described in the State Plan pursuant to § 456.305, by a lender other than a covered utility or participating home heating supplier:

(i) A lump-sum payment of outstanding principal and interest may be required by the lender upon default (as determined under applicable law) in payment by the eligible customer; and

(ii) No penalty shall be imposed by the lender for payment of all or any portion of the outstanding loan amount prior to the date such payment would otherwise be due.

(c) *Termination of Service.* No covered utility or participating home heating supplier shall terminate or otherwise restrict utility or fuel service to any customer for any default by such customer for payments due for any

services under the Residential Conservation Service Program.

**§ 456.312 Lists of suppliers, contractors, and lenders.**

(a) *Master Record.* The State Plan shall contain procedures for the preparation of a Master Record of all suppliers, contractors, and lenders who sell, install, or finance program measures in the State and who wish to be included in the lists distributed pursuant to paragraph (c) of this section. These procedures shall, at a minimum:

(1) Identify the entity(ies), hereinafter referred to as the "Listing Agency," which shall be responsible for the preparation and maintenance of the Master Record. The Listing Agency shall not be a regulated utility. The Listing Agency may assign duties to another person for the purpose of aiding in the compilation of the Master Record but the Governor, and no other person, shall be responsible for developing the criteria for inclusion in and delisting from the Master Record as well as the ultimate responsibility for the Master Record. No duties incident to the compilation of the Master Record of suppliers shall be assigned to a person that supplies program or State measures. No duties incident to the compilation of the Master Record of contractors shall be assigned to a person that installs program or State measures. No duties incident to compilation of the Master Record of lenders shall be assigned to a person that finances the sale or installation of program or State measures.

(2) Ensure that a reasonable attempt is made to inform all suppliers, contractors, and lenders who sell, install or finance program measures in the State of the pending compilation of the Master Record and the intended use of the Master Record, and provide such suppliers, contractors, and lenders an opportunity through effective notice to apply for inclusion in the Master Record. At a minimum, the following methods of notice shall be used:

(i) Publication in newspapers of general circulation in the State; and

(ii) Direct notification of appropriate trade associations.

(3) Ensure that all persons who agree to comply with the requirements of paragraph (b) (unless on the basis of past experience, the Governor determines that such person's agreement is not adequate assurance of compliance with the requirements of paragraph (b)), and only such persons, are included in the initial Master Record, and thereafter in the existing Master Record within a reasonable time after applying for inclusion.

(4) Ensure that all persons in the Master Record who fail to comply with the requirements of paragraph (b) are removed from the Master Record. The State Plan shall establish the criteria by which such failure shall be grounds for removal from the Master Record. Removal procedures shall ensure that:

(i) Each person proposed for such removal shall have:

(A) Written notice of the proposed removal and the grounds for such removal at least 30 days before the actual removal;

(B) An opportunity to respond in writing to the allegations contained in the notice described in paragraph (a)(4)(i)(A) of this section, with at least 30 days notice; and

(C) With respect to installers, access to the records of the Listing Agency regarding the inspections of the work of such installer.

(ii) Each person removed from the Master Record shall have an opportunity to file a complaint through and participate in, the redress proceeding and civil action described in § 456.315 for the purpose of contesting such removal.

(5) Ensure that all persons deleted from the Master Record have an opportunity to be included anew in the Master Record under criteria established by the Governor.

(6) Ensure that the name and address of any supplier, installer or lender who has been added to or deleted from the Master Record is forwarded to the appropriate covered utilities or home heating suppliers within 30 days of such addition or deletion.

(b) *Requirements for Inclusion in the Master Record.*

(1) The State Plan shall require that, when installing program measures under the circumstances described by the State Plan pursuant to § 456.305, all installation contractors included in the Master Record shall:

(i) Comply with any applicable installation standards found in Subparts G and I of this part and, with respect to materials for which there is an applicable standard in Subpart G or H, install only materials labeled as complying with DOE standards;

(ii) Install only measures covered by the measures warranty defined in § 456.105(j), except that no measures warranty is necessary for caulking and weatherstripping;

(iii) Furnish the customer with a written contract detailing the job to be performed and its cost, and certifying that any applicable State Plan requirements for installation and material standards will be complied with;

(iv) Assure that all individuals who are employed or otherwise retained by the contractor to install flue opening modifications, electrical or mechanical ignition systems, or wind energy devices have been qualified pursuant to the applicable provisions of § 456.314;

(v) Include in every contract a guarantee that the contractor will correct any violation of any installation standards in Subparts G or I of this part without cost to the customer;

(vi) Include in every contract for installation of a flue opening modification, electrical or mechanical ignition devices, or wind energy devices a guarantee to correct any violation of the standards in Subparts G–I of this part, without cost to the customer, as soon as possible after notification of any such violation by an inspector pursuant to § 456.313;

(vii) Have a binding surety contract sufficient in the judgment of the Governor to indemnify itself against possible liability arising from installation of program measures;

(viii) Comply with all applicable Federal, State and local laws and regulations; and

(ix) Agree to participate in good faith in the conciliation conference described in § 456.315(a) when there is a complaint by an eligible customer against such person.

(2) The State Plan shall require that, when supplying program measures under the circumstances described by the State Plan pursuant to § 456.305, all suppliers included in the Master Record shall:

(i) With respect to the program measures the supplier is listed as carrying, supply program measures that carry the measures warranty defined in § 456.105(j), except that no measures warranty is necessary for caulking and weatherstripping;

(ii) With respect to the program measures the supplier is listed as carrying, if there is any applicable standard found in Subparts G or H of this part, supply program measures that are labeled as complying with DOE standards;

(iii) Comply with all applicable Federal, State and local laws and regulations;

(iv) Have a method for informing customers of those products supplied by the supplier that are program measures, that have a measures warranty (except for caulking and weatherstripping), and that meet any applicable standard in Subparts G or H (as determined from a label stating that the product meets DOE standards); and

(v) Agree to participate in good faith in the conciliation conference described

in § 456.315(a) when there is a complaint by an eligible customer against such person.

(3) The State Plan shall require that, when financing the sale or installation of program measures under the circumstances described by the State Plan pursuant to § 456.305, all lenders included in the Master Record shall:

(i) Not take security in real property that is used as the principal residence of the eligible customer, unless the eligible customer acknowledges in writing that he or she is aware of the consequences of default on the loan;

(ii) Permit a rebate of unearned finance charges if an eligible customer prepays a loan (either voluntarily or as a result of default). Where prepayment is the result of default, the rebate shall be computed from the day of acceleration;

(iii) Comply with all applicable Federal, State and local laws and regulations; and

(iv) Agree to participate in good faith in the conciliation conference described in § 456.315(a) when there is a complaint by an eligible customer against such person.

(4) The State Plan may include additional requirements if the Assistant Secretary determines that such requirements are fair, nondiscriminatory, and do not adversely affect competition or the RCS Program.

(c) *Lists Distributed to Eligible Customers.* The State Plan shall require that every covered utility and participating home heating supplier provide, upon request to every eligible customer, lists of all suppliers, contractors, and lenders included in the Master Record who sell, install or finance program measures in their service area or such other reasonable area required by the State Plan.

(1) The State Plan shall require that these lists contain the following information in a fair, open, and nondiscriminatory manner.

(i) The name and address of each such supplier, contractor, and lender; and

(ii) An indication of which program measures such supplier, contractor, or lender will supply, install, or finance.

(2) The State Plan may require or allow the lists to indicate which type of a program measure a supplier or contractor sells or installs but shall not permit the inclusion of brand names. If the lists include information regarding types of program measures for one type of a program measure, then it shall include such information for all types of such measure. For example, if the lists indicate who sells wooden storm windows, then they must also indicate who sells aluminum or vinyl storm windows.

(3) The State Plan shall require that these lists include in a clear and conspicuous manner the following information:

(i) A statement that the persons listed have agreed to comply with any applicable DOE standards and State Plan procedures for the sale, installation, or financing of program measures under the circumstances described in the State Plan pursuant to § 456.305;

(ii) A description of the circumstances under which such standards shall be met and such procedures shall be followed;

(iii) A description of the complaints processing procedures required by § 456.315, including an explanation of who may have access to such procedures and how to gain access to such procedures; and

(iv) An invitation to all suppliers, contractors, and lenders not included on the lists to apply for inclusion.

(4) The State Plan may require or permit additional information to be included on the lists if the Assistant Secretary determines that it is fair, nondiscriminatory and does not adversely affect competition or the RCS Program.

(5) The State Plan shall contain procedures to ensure that these lists are updated for distribution to eligible customers at least every 30 days to reflect the additions and deletions received pursuant to paragraph (a)(6).

**§ 456.313 Post-installation inspection.**

(a) *Mandatory Inspection of All Flue Opening Modifications, Electrical or Mechanical Ignition Systems, and Wind Energy Devices.* The State Plan shall provide procedures for performing post-installation inspections of all flue opening modifications, electrical or mechanical ignition systems, and wind energy devices installed under the circumstances described in the State Plan pursuant to § 456.305. These procedures shall, at a minimum, assure:

(1) That such inspection occur within one week of the installation;

(2) That the inspector performing these inspections:

(i) Meets the applicable qualifications of §456.314; and

(ii) Has no financial interest in the contractor who installed the measure unless such contractor is a covered utility or participating home heating supplier;

(3) That such inspection examines compliance with the applicable installation standards found in Subparts G or I of this part; and

(4) That the results of such inspections are reported to:

(i) The customer, as soon as possible;

(ii) The installer, as soon as possible; and

(iii) The Listing Agency, within a reasonable time.

(b) *Random Inspection.* The State Plan shall:

(1) Provide procedures to assure the following inspections with respect to program measures installed under the circumstances described in the State Plan pursuant to § 456.305:

(i) Four of the first ten installations by each contractor of:

(A) Ceiling insulation;

(B) Floor insulation;

(C) Wall insulation;

(D) Active solar water heating; and

(E) Active solar space heating.

(ii) Ten percent of all installations of each program measure listed in paragraph (b)(1)(i) of this section. In fulfilling this requirement, the inspections made pursuant to paragraph (b)(1)(i) of this section may be included in the ten percent calculation. The inspections required by this subparagraph may be reduced in number at such time as the Governor demonstrates to the Assistant Secretary that a ten percent inspection is unnecessary to ensure safe and effective installation of these measures under the Program;

(iii) At least one inspection during the life of the Residential Conservation Service Program of the work of every contractor that makes an installation, under the circumstances described in the State Plan pursuant to § 456.305, for which there is an installation standard in Subpart G or I; and

(iv) An additional inspection of each contractor inspected pursuant to subparagraph (iii) who has been found through such inspection to have violated any applicable standard of Subparts G or I.

(2) Provide procedures to assure that the inspector performing these inspections:

(i) Meets the applicable qualifications of § 456.314; and

(ii) Has no financial interest in the contractor who installed the measures.

(3) Provide procedures to assure that such inspection examines compliance with any applicable installation standards found in Subparts G or I of this part.

(4) Provide procedures to assure that the results of such inspections are reported within a reasonable time to:

(i) The customer;

(ii) The installer; and

(iii) The Listing Agency.

(c) The State Plan shall identify the person(s) or agency(ies) responsible for administering the procedures for post-

installation inspections. Such person(s) or agency(ies) may be the Listing Agency.

**§ 456.314 Qualification procedures for auditors, installers and inspectors.**

(a) *Auditor Qualification Requirements.* The State Plan shall contain procedures to assure that the person or persons conducting an audit pursuant to the requirements of § 456.307 shall individually or collectively have the following qualifications:

(1) A general understanding of the three types of heat transfer and the effects of temperature and humidity on heat transfer;

(2) A general understanding of residential construction terminology and components;

(3) A general knowledge of the operation of the heating and cooling systems used in the residential building;

(4) A general knowledge of the different types of each applicable program and State measure; of the advantages, disadvantages and applications of each; and of any installation standards in Subparts G or I which apply to those measures or types;

(5) The capability to conduct the audit as required in § 456.307, including:

(i) A familiarity with the energy conserving practices required to be audited for;

(ii) The capability to determine the applicability of the program and any State measures; and

(iii) A proficiency in the pertinent auditing procedures, as prescribed in or pursuant to the State Plan, for each applicable program and State measure.

(6) Where a furnace efficiency modification is an applicable program measure, and the source of fuel for the existing furnace or boiler is either gas or oil, a working ability to calculate the steady state efficiency of the furnace or boiler as required by § 456.307(b)(7);

(7) Where a renewable resource measure, other than wind energy devices, is an applicable program or State measure, an understanding of the nature of solar energy and its residential applications, including:

(i) Insulation;

(ii) Shading;

(iii) Heat capture and transport; and

(iv) Where appropriate, heat transfer for hot water and space heating.

(8) Where a wind energy device is an applicable program or State measure, an understanding of the nature of wind energy and its residential applications, including:

(i) Wind availability;

(ii) Effects of obstructions;

(iii) Wind capture;

(iv) Power generation; and

(v) Interfaces with residential and utility power lines.

(b) *Installers and Inspectors of Flue Opening Modifications in Gas-Fired Furnaces.* [Reserved]

(c) *Installers and Inspectors of Electrical and Mechanical Ignition Systems.* [Reserved]

(d) *Installers and Inspectors of Wind Energy Devices.* [Reserved]

(e) *Quality Examiner.* The State Plan shall contain procedures to assure that those persons who will conduct the random inspections required by § 456.313 are familiar with any installation standards contained in Subparts G and I pertinent to the installations they are inspecting and are able to examine compliance of such installations with the applicable installation standards.

(f) *Assuring Individuals' Qualifications.* The State Plan shall contain a description of the method or methods by which individuals will be qualified to meet the requirements of paragraphs (a)–(e) of this section. The methods shall consist of one or more of the following:

(1) Training designed to instruct the individuals in the proper performance of their function(s);

(2) Tests designed to assess and certify the individuals' qualifications to perform their functions. Such tests may include either written or practical tests as determined necessary to meet the requirements of this section;

(3) Any other methods that assure that individuals identified in this section meet the appropriate qualifications prescribed in this section.

(g) *Additional Requirements with Respect to Qualifying Procedures.* The State Plan shall:

(1) Contain procedures which assure that persons are permitted, in a nondiscriminatory manner, to participate in the qualification procedures and describe how this will be done; and

(2) Identify the timetable for initial implementation of the qualification procedures and for subsequent implementation of such procedures. Such timetable shall, at a minimum, provide for initial implementation no later than ninety (90) days following the approval of the State Plan.

**§ 456.315 Complaints processing procedures.**

The State Plan shall contain procedures for resolving complaints which must include the following methods of complaint resolution:

(a) *Conciliation Conference for Customer Complaints.* A conciliation conference shall be made available for the purpose of resolving complaints by eligible customers against persons who sell, install or finance the sale or installation of program measures under the circumstances described in the State Plan pursuant to § 456.305.

(1) The procedures described in the State Plan for conciliation conferences shall ensure that:

(i) Participation in the conciliation conference is free of cost and easily accessible to the eligible customer making the complaint;

(ii) Participation in the conciliation conference by the eligible customer making the complaint is voluntary; and

(iii) The conciliation conference is conducted by an impartial conciliator who has no financial interest in any party involved in the complaint or in the outcome of the proceeding.

(2) The State Plan may permit the conciliation conference to be conducted by telephone.

(3) The State Plan shall identify the person(s) or agency(ies) responsible for administering the procedures for the conciliation conference.

(b) *Redress Proceeding.* A redress proceeding shall be made available to all persons alleging injury arising from an activity carried out under the State Plan or from a violation of the State Plan.

(1) The procedures described in the State Plan for redress proceeding shall ensure that:

(i) The redress proceeding is easily accessible to all persons alleging an injury under the Program or from a violation of the State Plan;

(ii) The redress proceeding is available to an eligible customer whether or not the eligible customer has participated in the conciliation conference described in paragraph (a) of this section;

(iii) All persons who have a substantial interest in the outcome of a redress proceeding are given timely and adequate notice of the proceeding and have an opportunity to participate in the proceeding;

(iv) The cost of access to and participation in the redress proceeding is kept at a minimum;

(v) The redress proceeding is held within a reasonable time after the initial complaint has been filed;

(vi) The redress proceeding is held before an impartial deciding official who as no financial interest in any party to the complaint or in the outcome of the proceeding;

(vii) Formal rules of evidence are not required;

(viii) The deciding official delivers a written decision and a brief statement of

reasons for coming to the decision within a reasonable time after the date of the proceeding;

(ix) The decision is enforceable under State law; and

(x) The decision and statement of reasons is sent to the Lead Agency within a reasonable time.

(2) The State Plan shall identify the person(s) or agency(ies) responsible for administering the procedures for the redress proceeding. Such person(s) or agency(ies) may be a State court if the requirements of this subsection are met.

(3) The Assistant Secretary may waive any of the requirements of this subsection upon a showing in the State Plan that an adequate and substantially equivalent State procedure exists which conflicts with one or more of the requirements of this subsection.

(c) *Civil Action.* A right of action in a State Court shall be made available for persons seeking recovery of damages for an injury arising from an activity carried out under the State Plan or from a violation of the State Plan. The State Plan shall cite the existing or proposed State law which gives a State court or courts jurisdiction over such civil actions.

**§ 456.316 Coordination.**

(a) *Other Programs.* The State Plan shall provide procedures to ensure effective coordination between its Residential Conservation Service Program as described in the State Plan and all local, State, and Federal energy conservation programs within and affecting the State which shall include, but not be limited to:

(1) Federal Energy Extension Service;

(2) Basic State Energy Conservation Program of the Department of Energy;

(3) Supplemental State Energy Conservation Program of the Department of Energy; and

(4) Weatherization Assistance Program for Low Income Persons.

(b) *Energy Suppliers.* If the State Plan permits coordination of Residential Conservation Service Programs among energy suppliers in the State then it shall provide procedures describing how such coordination may occur and ensuring that no collusion on prices charged to eligible customers will occur.

(c) *State Regulatory Authority.* If the Lead Agency is not the State regulatory authority, then the State Plan shall describe how the Lead Agency shall coordinate the implementation of the State Plan with the State regulatory authority.

**§ 456.317 Home heating suppliers.**

(a) *Consideration of Limited Resources.* If a State Plan covers home heating suppliers, it shall, within the terms of the requirements of this Subpart, take into account the limited resources of small home heating suppliers.

(b) *Participation and Withdrawal.* The State Plan, if it includes home heating suppliers, shall include a procedure by which the Governor shall allow a home heating supplier to participate in its Residential Conservation Service Program. The State Plan shall also provide for the voluntary withdrawal of participating home heating suppliers from its Residential Conservation Service Program.

(c) *Waiver of Requirements.* The State Plan shall contain a procedure by which the Governor may waive for any participating home heating supplier any requirement of the State Plan, except those listed below, upon a demonstration to the Governor's satisfaction that the resources of such supplier do not enable it to comply with the particular requirement. The requirements which the Governor shall not waive with respect to any home heating supplier who chooses to participate in the program are those established according to:

(1) Section 456.303 (Procedures for Investigating and Enforcing Compliance with the State Plan);

(2) Section 456.305 (Scope of Benefits), in that any benefit to which any eligible customer is entitled by receiving a service from a covered utility must also be available to any eligible customer who receives the same service from a participating home heating supplier;

(3) Section 456.306(d) (Calculation Procedures for the Program Announcement), if the participating home heating supplier provides a Program Announcement to its eligible customers;

(4) Sections 456.307(b) (3)–(7) (Accuracy of Auditing Procedures), for those measures for which a participating home heating supplier performs program audits for its eligible customers;

(5) Section 456.307(g) (Qualifications for Program Auditors);

(6) Those sections which prohibit anticompetitive activities or unfair discrimination by covered utilities or participating home heating suppliers, which are:

(i) Sections 456.306(a) (10) and (11) (Information Prohibited from the Program Announcement);

(ii) Section 456.307(a)(3) (Discrimination Among Customers in Providing Energy Audits);

(iii) Section 456.307(e) (Prohibitions and Disclosure in Auditing);

(iv) Section 456.307(f) (Furnace Audits);

(v) Section 456.308(e) (Prohibitions of Discrimination in Arranging Installation);

(vi) Section 456.309(e) (Prohibitions of Discrimination in Arranging Financing);

(vii) Sections 456.312(c) (1)–(4) (Content of Lists).

(7) The following reporting and recordkeeping requirements:

(i) Section 456.318(a)(1);

(ii) Section 456.318(a)(5), except that the Governor may waive § 456.318(a)(5)(v) concerning the accounting of program costs; and

(iii) Section 456.318(b) (Recordkeeping).

**§ 456.318 Reporting and recordkeeping.**

(a) *Reporting.* The State Plan shall contain provisions to assure that a report is submitted to the Assistant Secretary on July 1, 1981 and annually thereafter through July 1, 1986. The report shall contain the following information for the twelve-month period ending the preceding April 1, except that the Assistant Secretary may waive any of the reporting requirements, in approving the State Plan, for good cause.

(1) Any revision to the list of covered utilities and a list of participating home heating suppliers subject to the State Plan;

(2) A list of covered utilities subject to the State Plan engaged in supplying, installing, or financing energy conservation or renewable resource measures pursuant to § 456.503 (Exception for Certain Measures and Small Loans) of these rules, and a brief description with respect to each utility of the nature of the exempted activity in which it is engaged;

(3) A list of covered utilities subject to the State Plan engaged in supplying, installing, or financing energy conservation or renewable resource measures pursuant to § 456.504 (Exception for Existing Supply, Installation and Financing) and a brief description with respect to each utility of the nature of the exempted activity in which it is engaged;

(4) A list of all covered utilities subject to the State Plan which are engaged in supplying, installing, or financing energy conservation or renewable resource measures pursuant to a waiver granted under § 456.505 (Waivers), or which are petitioning for such a waiver;

(5) For each covered utility or participating home heating supplier:

(i) The approximate number of eligible customers and, if available, the percentage of those customers for whom

the utility or heating supplier is the primary heating fuel supplier;

(ii) A copy of the Program Announcement distributed to eligible customers;

(iii) The number of eligible customers who have requested each service and the number of requests the utility or participating home heating supplier has fulfilled, including:

(A) The number of program audits performed;

(B) The number of installations arranged by the covered utility or participating home heating supplier;

(C) The number of loans arranged by the covered utility or participating home heating supplier;

(D) The number of customers, if any, who are using the utility's billing service for repayment of loans;

(E) The number of installations, if any, of program measures which the covered utility or participating home heating supplier supplied, installed, or financed;

(iv) The number and function of people assigned to the covered utility's or participating home heating supplier's program, including part-time employees; and

(v) The costs incurred by the utility or home heating supplier in providing each service under the Residential Conservation Service Program including separately those costs paid by individual customers for services received and those costs paid by all ratepayers.

(6) The number and nature of complaints by eligible customers against suppliers, contractors, and lenders which have been handled through the conciliation conference established under § 456.315(a);

(7) The number of persons seeking redress through the procedures described in § 456.315(b), and the nature of their allegations;

(8) A brief description of the status of activities carried out pursuant to § 456.314 (Qualification Procedures for Auditors, Installers and Inspectors) including whether sufficient qualified personnel are available for program needs, the reasons for any shortages and the proposed resolution of any such shortage problem;

(9) The number of persons added to or removed from the Master Record established according to § 456.312, and the reasons for removal of persons;

(10) The number and results of post-installation inspections conducted according to § 456.313;

(11) The number and function of State employees assigned to the Residential Conservation Service Program, including part-time employees;

(12) The cost to the State of developing and implementing the State Plan; and

(13) A citation to and brief description of any State or local law or regulation relevant to the State Plan and the status of any proposed State or local legislation or regulation relevant to the State Plan.

(b) *Recordkeeping.* The State Plan shall contain procedures to assure that the following records are kept for the periods indicated and made available to the Assistant Secretary upon request, except that the Assistant Secretary may for good cause waive any of the record-keeping requirements in approving the State Plan.

(1) The name and address of each eligible customer who receives a program audit, which shall be kept for five years from the date of such program audit;

(2) A copy of the data collected during the audit, and a copy of the estimates of costs and savings presented to the customer, which shall be kept for five years from the date of such program audit;

(3) A copy of all requests furnished by eligible customers for furnace audits pursuant to § 456.307(f), which shall be kept for five years from the date of such request;

(4) The name and address of each eligible customer for whom a covered utility or participating home heating supplier arranges installation or financing of a program measure, which shall be kept for five years from the date of such arrangement;

(5) The amount and cost of fuel purchased each month or other billing period for the twelve months prior to and the twelve months following each program audit for each eligible customer, which shall be kept for two years from the date of such program audit; and

(6) The names of the individuals who have met the qualification criteria described in § 456.314. These records shall be:

(i) Updated within a reasonable period of time following each implementation of the qualification procedures, and

(ii) Maintained separately for installers and inspectors of flue opening modifications, electrical or mechanical ignition devices and wind energy devices.

**§ 456.319 State measures.**

(a) The State may require or allow covered utilities or participating home heating suppliers to offer services for State measures in conjunction with the RCS Program subject to the approval of the Assistant Secretary in the State Plan.

(b) The Assistant Secretary may approve a State measure to be offered in conjunction with the RCS Program if:

(1) The measure is an energy conservation measure;

(2) The measure is a renewable resource measure; or

(3) The State Plan contains the following:

(i) Information demonstrating that the measure effectively saves oil, oil and gas, or nonrenewable energy sources, and does not increase the consumption of oil;

(ii) A method for adequately ensuring safe installation and use of such measure;

(iii) Adequate assurances that offering such measure in conjunction with the RCS Program will not adversely affect the environment, competition or the RCS Program in the State and will not increase the cost to an eligible customer of a program audit under the RCS Program; and

(iv) An adequate analysis of the effects on the environment of offering the State measures in conjunction with the RCS Program.

(c) The State Plan shall describe how the State measures are to be offered in conjunction with the RCS Program.

(d) The State Plan shall describe what action, if any, by an eligible customer shall entitle such customer to the benefits listed in § 456.305(a) with respect to State measures, and under what circumstances other benefits, if any, will be provided to eligible customers with respect to State measures.

(e) The State Plan shall require that if a covered utility or participating home heating supplier arranges the installation or financing of any State measure in an eligible customer's residence, the benefits listed in § 456.305(a) shall be available to such eligible customer and the provisions of §§ 456.308 and 456.309 shall apply in the same manner as they apply for program measures.

(f) If the State Plan contains procedures for including the names of persons who supply, install or finance the sale or installation of State measures on the lists distributed pursuant to the RCS Program, the requirements of § 456.312 shall apply to State measures in the same manner as they apply to program measures.

(g) The State Plan shall require that an explanation of any differences between the benefits or protections connected with State measures and the benefits or protections connected with program measures, be clearly stated in the

Program Announcement, during the audit, and on any lists of names of persons who supply, install or finance the sale or installation of State measures that are included with the lists distributed pursuant to the RCS Program.

## Subpart D—Nonregulated Utility Plans

### § 456.401 Scope.

This Subpart identifies the responsibilities of covered nonregulated utilities not subject to a State Plan for the preparation and submission of Nonregulated Utility Plans, the procedures for approval of Nonregulated Utility Plans by the Assistant Secretary, and the minimum requirements for the content of Nonregulated Utility Plans.

### § 456.402 Coverage.

This Subpart shall apply to all nonregulated covered utilities which are not covered by a State Plan.

### § 456.403 Initial submission.

Each utility subject to this Subpart shall notify the Assistant Secretary, within 60 days after the effective date of these rules, of the person responsible for the preparation of its Nonregulated Utility Plan.

### § 456.404 Coordination requirements.

Each utility subject to this Subpart shall, to the extent feasible, coordinate the preparation of its Nonregulated Utility Plan for the preparation of the applicable State Plan for the purpose of minimizing inconsistent provisions between the two plans.

### § 456.405 Notice, comment, and public hearing.

Prior to submission of the Nonregulated Utility Plan to the Assistant Secretary for approval, the nonregulated utility shall:

(a) *Notice and Comment.* Provide meaningful public notice of the requirement for the nonregulated utility to submit a Nonregulated Utility Plan. To be meaningful, this notice shall, at a minimum:

(1) Appear in newspapers of general circulation published in the nonregulated utility's service area;

(2) Indicate where a copy of the proposed Nonregulated Utility Plan can be obtained and where questions concerning the Plan can be answered;

(3) Indicate the date, time, and location of each public hearing to be held pursuant to § 456.405(b) with at least 30 days notice; and

(4) Invite public comments on the content of the proposed Nonregulated Utility Plan, at least 30 days prior to the final date for receiving such comments.

(b) *Hearing.* Hold at least one public hearing in the nonregulated utility's service area for the purpose of hearing testimony and receiving comments on the content of the proposed Nonregulated Utility Plan.

### § 456.406 Procedures for submission and approval of nonregulated utility plans.

(a) *Submission.* Each utility subject to this Subpart shall submit to the Assistant Secretary within 180 days of the effective date of these rules a proposed Nonregulated Utility Plan. The time for submission may be extended by the Assistant Secretary if:

(1) The nonregulated utility requests an extension at least 10 days prior to the formal deadline; and

(2) Good cause is shown for allowing an extension.

(b) *Approval.* (1) If a proposed Nonregulated Utility Plan meets the criteria of this Subpart, the Assistant Secretary shall approve it within 90 days of the date the proposed Nonregulated Utility Plan was submitted.

(2) Within 210 days after the approval of the Nonregulated Utility Plan, the nonregulated utility shall provide to the Assistant Secretary a statement certifying whether or not it is in compliance with its Nonregulated Utility Plan.

(c) *Disapproval.* (1) If a Nonregulated Utility Plan does not meet the criteria of this Subpart, the Assistant Secretary shall, within 90 days of the date the proposed Nonregulated Utility Plan was submitted, disapprove the proposed Nonregulated Utility Plan and specify in writing the grounds for disapproval.

(2) Within 60 days of the date of disapproval of a proposed Nonregulated Utility Plan, or such longer period as the Assistant Secretary may determine pursuant to the criteria of paragraph (a) of this section, the nonregulated utility shall submit another proposed Nonregulated Utility Plan. Except for the time in which a proposed Nonregulated Utility Plan must be submitted and the requirements for notice, comment, and a public hearing, the procedures of this Subpart for submission of the original proposed Nonregulated Utility Plan shall be applicable to the submission of any proposed Nonregulated Utility Plan submitted after initial disapproval. The Assistant Secretary may, in disapproving a plan, require that the notice, comment, and public hearing requirements be complied with prior to resubmission.

(d) *Amendments.* (1) The nonregulated utility may submit proposed amendments to an approved Nonregulated Utility Plan at any time.

(2) Except for the time in which a proposed plan must be submitted, the procedures of this Subpart for submission of the original Nonregulated Utility Plan shall be applicable to the submission of proposed amendments to an approved Nonregulated Utility Plan.

### § 456.407 Temporary programs.

A nonregulated utility may submit a temporary program as defined in § 456.208(a) in accordance with the procedures and criteria of § 456.208. This submittal may be a part of the proposed Nonregulated Utility Plan or a separate submission.

### § 456.408 Content of plans.

(a) *General Requirements.* (1) Except as provided in this section, each Nonregulated Utility Plan shall meet all the requirements for State Plans in Subpart C.

(2) Except as otherwise provided in this section, all references in Subpart C to:

(i) Covered utilities shall be deemed to refer to utilities subject to this Subpart;

(ii) A State Plan shall be deemed to refer to a Nonregulated Utility Plan;

(iii) Participating home heating suppliers shall not apply;

(iv) A State (as a governmental entity, other than references to State laws or regulations) or any State Agency or officer shall be deemed to refer to the nonregulated utility submitting the Plan; and

(v) A State (as a geographic area) shall be deemed to refer to the nonregulated utility's service area.

(b) *Program Announcement.* A Nonregulated Utility Plan need not contain a provision comparable to that required for State Plans in § 456.306(d)(3)(i): *Provided,* That the nonregulated utility shall coordinate with the State Lead Agency to minimize inconsistencies with respect to the estimates of costs and savings contained in Program Announcements distributed by the nonregulated utility and those distributed by utilities subject to the State Plan in the same area.

(c) *Quality Examiner Financial Interest.* Where a nonregulated utility installs program measures, the prohibition in § 456.313(b)(2)(ii) against quality examiners having any financial interest in the installing contractor shall not apply with respect to installations made by the nonregulated utility.

(d) *Complaint Processing Procedures.* The requirements of §§ 456.315(b)(1)(ix) and 456.315(c) are not applicable to Nonregulated Utility Plans.

(e) *Coordination and Home Heating Suppliers.* The requirements of

§§ 456.316(b) and (c) and 456.317 are not applicable to Nonregulated Utility Plans.

(f) *Reporting Requirements.* The requirements of §§ 456.318(a)(1)–(4) are not applicable to Nonregulated Utility Plans.

(g) *Utilizing State Services.* (1) In a State submitting a State Plan, a nonregulated utility may, by written understanding with the appropriate State agency, utilize services which have been provided for in the State Plan.

(2) If a Nonregulated Utility Plan utilizes services as permitted by this subsection, all references in the State Plan to those services with regard to utilities subject to the State Plan shall be deemed to refer to the nonregulated utility.

(3) If a Nonregulated Utility Plan uses a Master Record produced under a State Plan, the nonregulated utility may not add or delete contractors, suppliers, or lenders from that Master Record, and shall add or delete contractors, suppliers, or lenders from any list distributed only in accordance with the State Plan.

(4) If a Nonregulated Utility Plan proposes to utilize any of the services pursuant to this subsection, the Plan shall so state and copies of the written agreements with the appropriate State Agencies shall be included with the Nonregulated Utility Plan in the submission to the Assistant Secretary.

## Subpart E—Supply, Installation, and Financing by Utilities

### § 456.501 Scope and definitions.

(a) This Subpart contains the prohibition against a utility's supply, installation, and financing of energy conservation and renewable resource measures. It also specifies the exceptions to this prohibition and the procedures, where applicable, for obtaining those exceptions.

(b) For purposes of this Subpart:

(1) A "covered utility" means a covered utility, any company which is owned or controlled by such a utility, or any company which owns or controls such a utility.

(2) A covered utility "installs" a measure whenever the contract for installation obligates either the covered utility or any persons who have exclusive contracts with the utility to install the measure.

(3) A utility "supplies" a measure when it sells a measure at retail or leases a measure to an eligible customer.

(4) A utility "finances" the supply or installation of a measure when the loan contract names as the lender either the utility or any persons who have exclusive contracts or agreements with the utility to make loans for the measure.

### § 456.502 Prohibition.

(a) Except as provided in this Subpart, no covered utility may supply, install, or finance the supply or installation of any energy conservation or renewable resource measure.

(b) Notwithstanding §§ 456.503–456.506, no covered utility may supply, install, or finance the supply or installation of any energy conservation or renewable resource measure if the Assistant Secretary has determined, after notice and opportunity for public hearing, and after consultation with the Federal Trade Commission, that:

(1) Such supply, installation, or financing is being carried out by such utility at unreasonable rates or on unreasonable terms or conditions, or

(2) Such supply, installation, or financing carried out by such utility has a substantial adverse effect upon competition.

(c) Violations of this section are subject to a civil penalty of not more than $25,000 for each day of violation assessed by order of the Assistant Secretary pursuant to Sections 216(h) and 219 of NECPA and § 456.606 of these rules.

### § 456.503 Exception for certain measures and small loans.

(a) The prohibition in § 456.502(a) shall not apply to the supply, installation, or financing of (1) furnace efficiency modifications, (2) clock thermostats, and (3) devices associated with load management techniques.

(b) The prohibition in § 456.502(a) shall not apply to the financing of the purchase or installation of an energy conservation or renewable resource measure if the principal of such loan does not exceed $300.

### § 456.504 Exception for existing supply, installation, and financing.

(a) Any supply, installation, or financing of any energy conservation or renewable resource measure that the covered utility was engaged in on November 9, 1978, shall not be subject to the prohibition in § 456.502(a):

(1) Prior to thirty days after the effective date of these rules,

(2) During such time as applications for determinations with respect to such activity, filed in accordance with § 456.507, are pending, and

(3) Upon a final determination that such energy conservation or renewable resource measure was being supplied, installed, or financed on November 9, 1978 by the utility seeking the determination.

(b) Any supply, installation, or financing of any energy conservation or renewable resource measure which the covered utility had by November 9, 1978, broadly advertised that it would supply, install, or finance, or with respect to which the utility had by November 9, 1978, completed substantial preparations for supplying, installing, or financing shall not be subject to the prohibition in § 456.502(a):

(1) Prior to thirty days after the effective date of these rules,

(2) During such time as applications for determinations with respect to such activity filed in accordance with § 456.507 are pending,

(3) Upon a final determination that the utility had by November 9, 1978, either broadly advertised its supply, installation, or financing of such measures or had completed substantial preparations for its supplying, installing, or financing of such measures.

### § 456.505 Waivers.

(a) The Assistant Secretary may waive any prohibition of § 456.502(a) upon petition by a covered utility pursuant to § 456.507 and a finding that:

(1) The petition, in the case of a covered utility subject to a State Plan, is supported by the Governor, and

(2) If such waiver were granted:

(i) Fair and reasonable prices and rates of interest would be charged, and

(ii) The otherwise prohibited activities would not involve or result in unfair methods of competition or unfair or deceptive acts or practices.

(b) Before the Assistant Secretary makes the finding described in paragraph (a)(2)(i) of this section, he or she shall consult with those staff members of the Federal Trade Commission as the Chairman of the Commission may designate.

### § 456.506 Exception for supply, installation, and financing authorized by State or local law.

(a) The prohibition in § 456.502(a) shall not apply to any supply, installation, or financing of any energy conservation or renewable resource measure:

(1) Which a State or local law or regulation required or explicitly permitted a covered utility to engage in; or

(2) Which the Attorney General of the appropriate State certifies to the Assistant Secretary was intended by a State law or regulation in effect on November 9, 1978, to be required or permitted.

(b) A covered utility is exempted from any Federal requirement to include in its RCS Program any supply, installation, or

financing of any energy conservation or renewable resource measure in which it is engaged by reason of the exception in paragraph (a) of this section. If a covered utility includes activities in its RCS Program in which it is engaged by reason of the exception in paragraph (a), it shall be subject to all the requirements of the State Plan with respect to those activities in the same manner as any other contractor, supplier, or lender, except that it shall be exempt from the requirements of §§ 456.310 and 456.311 with respect to such activities.

**§ 456.507 Procedure for obtaining determinations and waivers.**

(a) A utility making an application for a determination under § 456.504 or a petition for a waiver under § 456.505 shall file such application or petition clearly labelled as such with the Assistant Secretary, Department of Energy, 20 Massachusetts Avenue, N.W., Washington, D.C. 20545. All such petitions shall contain all information necessary for the determination under § 456.504 or the findings required by § 456.505.

(b) In addition to any other requirement that may be applicable, any utility making an application or petition under this section shall give direct notice to the Governor, State Energy Office, and State Regulatory Authority of any State in which such exception or waiver would be applicable, informing them that they may within ten days submit comments on the application or petition to the Assistant Secretary. The application or petition filed with the Assistant Secretary shall include a certification that the applicant or petitioner has complied with the requirements of this subsection. In the discretion of the Assistant Secretary, opportunity to comment may be provided to other interested persons.

**§ 456.508 Appeals.**

Any person adversely affected by any decision made pursuant to this Subpart by the Assistant Secretary may appeal that decision in accordance with Subpart G of part 205 of these rules. All such appeals shall be filed with the Office of Hearings and Appeals, Department of Energy, Washington, D.C. 20461.

## Subpart F—Federal Standby Authority and Enforcement Provisions

**§ 456.601 Scope.**

This Subpart specifies the procedures to be followed to ensure that eligible customers receive the services of the Residential Conservation Service Program when a State or nonregulated utility does not submit an acceptable Residential Conservation Service Plan within the necessary time or fails to implement adequately an approved plan. These procedures are required to be implemented by the Secretary pursuant to the provisions of section 219 of NECPA. All of the Secretary's responsibilities under this Subpart, except for the authority to bring actions in any court of the United States, have been delegated to the Assistant Secretary. Section 456.602 specifies the conditions under which the Assistant Secretary shall invoke standby authority for covered regulated utilities and covered nonregulated utilities. Sections 456.603 and 456.604 specify the content of the Federal plans for States and nonregulated utilities, respectively. Section 456.605 specifies the procedures followed by the Secretary if a public utility fails to comply with a Federal standby order issued pursuant to §§ 456.603 or 456.604. Section 456.606 specifies the civil penalties which the Assistant Secretary may assess and the enforcement provisions.

**§ 456.602 Conditions under which standby authority shall be invoked.**

The Assistant Secretary shall invoke standby authority if he determines:

(a) That a State fails to submit a Residential Conservation Service Plan meeting the requirements of Subparts B and C within 270 days after the effective date of these rules or within such additional period as the Assistant Secretary allows pursuant to § 456.206 (b) or (d);

(b) That a nonregulated utility fails to submit a Residential Conservation Service Plan meeting the requirements of Subpart D within 270 days after the effective date of these rules or within such additional period as the Assistant Secretary allows pursuant to § 456.406 (a) or (c);

(c) After notice and opportunity for a public hearing, that an approved State plan is not being adequately implemented in a State; or

(d) After notice and opportunity for a public hearing, that an approved plan is not being adequately implemented by a covered nonregulated utility.

**§ 456.603 Standby authority in lieu of State plans.**

When the Assistant Secretary determines that one of the conditions specified in § 456.602 (a) or (c) exists:

(a) The Assistant Secretary shall promulgate a Residential Conservation Service Plan which meets the appropriate requirements of Subpart B and C of this part and which is applicable to each covered regulated utility in the State;

(b) The Assistant Secretary shall, by order, require each covered regulated utility in the State to carry out a Residential Conservation Service Program, which meets the requirements of the plan promulgated pursuant to paragraph (a) of this section, within 90 days of the issuance of the order; and

(c) If the State had an approved plan which included nonregulated utilities, the Assistant Secretary shall take the actions described in §§ 456.604 (a) and (b) with respect to such nonregulated utilities.

**§ 456.604 Standby authority for nonregulated utilities.**

When the Assistant Secretary determines that one of the conditions specified § 456.602 (b) or (d) exists:

(a) The Assistant Secretary shall, by order, require the covered nonregulated utility to promulgate a plan which meets the requirements of Subpart D of this part; and

(b) The Assistant Secretary shall, by order, require such nonregulated utility to carry out a Residential Conservation Service Program, which meets the requirements of the plan promulgated pursuant to paragraph (a) of this section, within 90 days of the issuance of the order.

**§ 456.605 Failure to comply with orders.**

If the Secretary determines that any covered utility to which an order has been issued pursuant to §§456.603(b), 456.604(a) or § 456.604(b) has failed to comply with such order, the Secretary may file a petition in the appropriate United States district court to enjoin such utility from violating the order.

**§ 456.606 Enforcement provisions.**

(a) Any covered utility which violates any requirement of a plan promulgated under §§ 456.603(a) or 456.604(a), or which fails to comply with an order under §§ 456.603(b), 456.604(a), or § 456.604(b) within 90 days from the issuance of such order, or which violates the prohibition in § 456.502 concerning supply, installation, or financing by covered utilities, shall be subject to a civil penalty of not more than $25,000 for each violation.

(b) Each day that such violation continues shall be considered a separate violation.

(c) A civil penalty under this section shall be assessed by ar order of the Assistant Secretary.

(d) Before issuing an order assessing a civil penalty against any person under this section, the Assistant Secretary shall provide to such person notice of

the proposed penalty. The notice of proposed penalty shall inform the person of the opportunity to make an election, in writing, within 30 days after receipt of the notice. The election involves deciding whether to have the procedures of paragraph (f) of this section apply, in lieu of the procedures in paragraph (e) of this section, with respect to the assessment of a civil penalty.

(e)(1) Unless the election described in paragraph (d) of this section is made within 30 calendar days after receipt of the notice given under paragraph (d) of this section, the Assistant Secretary shall assess the penalty, by order, after a determination of violation has been made on the record. Such determination of violation shall be made after an opportunity has been afforded for an agency hearing pursuant to Section 554 of Title 5, United States Code, before an administrative law judge appointed under Section 3105 of Title 5. The assessment order shall include the administrative law judge's findings and the basis for such assessment.

(2) Any person against whom a civil penalty is assessed under this subsection may, within 60 calendar days after the date of the order of the Assistant Secretary assessing the penalty, institute an action in the United States court of appeals for the appropriate judicial circuit for judicial review of such order in accordance with Chapter 7 of Title 5, United States Code. The court shall have jurisdiction to enter a judgment affirming, modifying, or setting aside, in whole or in part, the order of the Assistant Secretary, or the court may remand the proceding to the Assistant Secretary for such further action as the court may direct.

(f)(1) In any case where the procedures of this subsection have been elected, as described in paragraph (d) of this section, the Assistant Secretary shall assess such penalty by order. The order shall be made not later than 60 calendar days after the alleged violator's date of receipt of notice of the proposed penalty under paragraph (d) of this section.

(2) If the civil penalty assessed by order under paragraph (f)(1) of this section has not been paid within 60 calendar days after the assessment order was made, the Secretary shall institute an action in the appropriate district court of the United States for an order affirming the assessment of the civil penalty. The court shall have authority to review de novo the law and the facts involved, and shall have jurisdiction to enter a judgment enforcing, modifying, and enforcing as so modified, or setting aside in whole or in part, such assessment.

(3) Any election to have this Subsection apply may not be revoked, except with the consent of the Assistant Secretary.

(g) If any person fails to pay an assessment of a civil penalty after it has become a final and unappealable order under paragraph (e) of this section, or after the appropriate district court has entered final judgment in favor of the Secretary under paragraph (f) of this section, the Secretary shall recover the amount of such penalty in any appropriate district court of the United States. In such action, the validity and appropriateness of the respective final order or judgment imposing the civil penalty shall not be subject to review.

(h) Notwithstanding the provisions of Title 28, United States Code, or of Section 502 of the Department of Energy Organization Act, the Secretary shall be represented by the General Counsel of the Department of Energy (or any attorney or attorneys within the Department of Energy designated by the Secretary) who shall supervise, conduct, and argue any civil litigation to which this section applies (including any related collection action) in a court of the United States or in any other court, except the Supreme Court. However, the Secretary or the General Counsel shall consult with the Attorney General concerning such litigation and the Attorney General shall provide, on request, such assistance in the conduct of such litigation as may be appropriate.

## Subpart G—Renewable Resource Installation and Materials Standards

### § 456.701 Scope.

This Subpart contains both the installation and materials standards with respect to renewable resource measures. Not all renewable resource measures have installation or materials standards under these rules. Those measures not addressed in this Subpart either have been determined not to require standards or have not yet been determined whether or not they require standards. The *HUD Intermediate Minimum Property Standards Supplement,* Solar Heating and Domestic Hot Worker Systems, 4930.2, 1977 Edition is incorporated by reference into this Subpart as though set forth in full herein, pursuant to 5 U.S.C. § 552(a). Identification, description, and information regarding availability of and future changes to the incorporated standards are contained in Appendix II to this Part.

### § 456.702 Solar domestic hot water and active solar space heating systems.

(a) Solar Domestic Hot Water Systems, other than Thermosiphon Hot Water Heaters, and Active Solar Space Heating Systems shall be constructed and installed in compliance with the *HUD Intermediate Minimum Property Standards Supplement,* Solar Heating and Domestic Hot Water Systems, 4930.2, 1977 Edition, U.S. Department of Housing and Urban Development.

(b) Any reference in the *HUD Intermediate Minimum Property Standards Supplement* to exceptions or alternatives that may be approved by HUD with respect to the standards therein shall not apply under this section.

### § 456.703 Thermosiphon hot water heaters. [Reserved]

### § 456.704 Swimming pool heaters. [Reserved]

### § 456.705 Wind systems installation standards. [Reserved]

### § 456.706 Wind systems material standards. [Reserved]

## Subpart H—Energy Conservation Material Standards

### § 456.801 Scope and coverage.

This subpart identifies and describes minimum standards for safety and effectiveness of certain products and materials which are energy conservation measures when they are used in the RCS Program. Certain standards are incorporated by reference into this Subpart as though set forth in full herein, pursuant to 5 U.S.C. § 552(a). Identification, description, and information regarding availability of and future changes to the incorporated standards are contained in Appendix II to this Part.

### § 456.802 General requirements and definitions.

(a) *General Requirements.* (1) Only products meeting these material standards may be marked, "Conforms to DOE Standards."

(2) Thermal insulation materials shall contain no asbestos which has been intentionally added nor which occurs as a contaminant.

(3) Composition of sample material shall not be altered to produce qualifying specimens for the tests required to meet these material requirements.

(b) *Definitions.* (1) "AAMA" means Architectural Aluminum Manufacturers Association.

(2) "ASTM" means American Society for Testing and Materials.

(3) "ASTM C 516" means ASTM Standard Specification for Vermiculite Loose Fill Insulation.

(4) "ASTM C 520" means ASTM Standard Method for Density of Granular Loose-Fill Insulation.

(5) "ASTM C 578" means ASTM Standard Specification for Preformed, Block-Type Cellular Polystyrene Thermal Insulation.

(6) "ASTM 576–76" means ASTM Standard Test Method for Dew/Frost Point of Sealed Insulating Glass Units in Vertical Position.

(7) "ASTM E 84" means ASTM Standard Test Method for Surface Burning Characteristics of Building Materials.

(8) "ASTM E 96" means ASTM Standard Test Method for Water Vapor Transmission of Materials in Sheet Form.

(9) "ANSI" means American National Standards Institute.

(10) "Automatic Ignition System" means a system comprised of a pilot ignition device, pilot flame sensing means, control system, and associated automatic valving for application to an existing pilot burner and designed to:

(i) Ignite the pilot burner on a call for heat;

(ii) Prove the presence of the pilot flame and allow main burner gas to flow;

(iii) Automatically act to shut off the gas supply to the main burner and pilot burner when the pilot burner is not proved.

(11) "Cellular Polystyrene Thermal Insulation" means an organic foam composed principally of polymerized styrene resin processed to form a homogeneous rigid mass of cells.

(12) "CPSC" means U.S. Consumer Product Safety Commission.

(13) "CPSC Part 120" means U.S. Consumer Product Safety Commission Safety Standard for Architectural Glazing Materials.

(14) "CPSC Part 1209" means U.S. Consumer Product Safety Commission Interim Safety Standard for Cellulose Insulation, 16 CFR Part 1209 (July 6, 1979) and any amendments thereto.

(15) "CPSC Part 1404" means U.S. Consumer Product Safety Commission Cellulose Insulation Labeling Requirement, 16 CFR Part 1404 (July 6, 1979).

(16) "Critical Radiant Flux" means the level of incident radiant heat energy on the insulation below which flames will cease to propagate, as determined according to the test procedure described in CPSC 16 CFR Part 1209.

(17) "F.H.D.A." means Fir and Hemlock Door Association.

(18) "HH–I–515D" means Federal Specification HH–I–515D Insulation, Thermal (Loose-Fill for Pneumatic or Poured Application): Cellulosic or Wood Fiber.

(19) "HH–I–524B" means Federal Specification HH–I–524B Insulation Board, Thermal (Polystyrene).

(20) "HH–I–530A" means Federal Specification HH–I–530A Insulation Board, Thermal (Polyurethane and Polyisocyanurate).

(21) "HH–I–558B" means Federal Specification HH–I–558B Insulation Blocks, Boards, Blankets, Felts, Sleeving, and Pipe Fitting Coverings.

(22) "HH–I–574B" means Federal Specification HH–I–574B Insulation, Thermal (Perlite).

(23) "HH–I–585C" means Federal Specification HH–I–585C Insulation, Thermal (Vermiculite).

(24) "HH–I–1030A" means Federal Specification HH–I–1030A Insulation, Thermal (Mineral Fiber for Pneumatic or Poured Application).

(25) "HH–I–1252B" means Federal Specification HH–I–01252B Insulation, Thermal Reflective (Aluminum Foil).

(26) "Loose-Fill cellulosic or wood fiber thermal insulation" means thermal insulation composed of chemically treated cellulosic or wood fibers, or any combination thereof, suitable for pneumatic or poured application.

(27) "Loose-fill mineral fiber thermal insulation" means insulation composed of mineral substances such as slag, rock, or glass, suitable for pneumatic or poured application.

(28) "Mineral fiber blanket and batt thermal insulation" means flexible units composed of felted inorganic fibers with or without binders, in rolls or strips, with or without attached membrane coverings.

(29) "Multi-glazing" means an arrangement of two or more separated layers of glazing (providing one or more insulating air spaces). Multi-glazing can be achieved by installing a preassemebled, sealed insulating glass unit or by affixing one or more additional sheets of glazing onto an existing window, sash, or glass.

(30) "NBS/PS" means National Bureau of Standards Voluntary Product Standard.

(31) "NWMA" means National Woodworking Manufacturers Association.

(32) "Smoldering Combustion" means the combustion of solid materials without the accompaniment of flame, when determined according to the test procedure described in CPSC 16 CFR Part 1209.

(33) "Storm Door" means a door installed outside or inside a prime door, creating an insulating air space to provide greater resistance to heat flow than the prime door alone.

(34) "Storm Window" means a unit consisting of glazing installed in a window opening either outside or inside a prime window, creating an insulating air space to provide greater resistance to heat flow than the prime window alone. The storm window may be removable or permanently attached.

(35) "Thermal Door" means a unit installed in a door opening which has an R-value of at least two (2) and is weatherstripped to provide greater resistance to heat flow.

(36) "Thermal Resistance" (R-value) means the resistance to the flow of heat of a particular body or assembly. "R-value" is measured in the United States customary units, $ft^2$-hr-°F/Btu.

(37) "Thermal Resistivity" is a property of a homogenous material measured by its thermal resistance per unit thickness. Thermal resistivity is measured in the United States customary units, $ft^2$-hr-°F/Btu-in.

(38) "Thermal Window" means a window system with improved thermal performance through the use of multiple glazing and more airtight construction. Some thermal windows also provide an insulating frame and sash to provide greater thermal efficiency.

(39) "Vent Damper" means a device which automatically closes vents on oil and gas-fired appliances to prevent the escape of heat through the vent pipe when the main burner is not being fired. The device may be thermally, mechanically, or electrically actuated.

(40) Other definitions of terms relating to thermal insulating materials are found in ASTM C 168, "Thermal Insulating Materials."

(c) *Conversions.* Conversions between United States customary units and metric (S.I.) units are based on conversion factors listed in ASTM E 380–76, "Standard for Metric Practice," and ANSI/ASTM E 621–78 "Standard Practice for the Use of Metric (S.I.) Units in Building Design and Construction."

**§ 456.803 Standard for loose-fill cellulosic or wood-fiber thermal insulation.**

(a) *Scope.* This section applies only to loose-fill cellulosic or wood-fiber thermal insulation.

(b) *Material Requirements.* (1) For vermin-resistance and odor emission, the material shall meet the requirements of HH–I–515D.

(2) For moisture absorption, the material shall meet the requirements of HH–I–515D, except the container may be 200 mm × 200 mm × 100 mm ( 8 inches × 8 inches × 4 inches).

(3) For fungi resistance, the material shall meet the requirements of HH–I–515D with the following changes:

(i) The core of 12.5 mm (0.5 ins) regular gypsum wall board shall be used as the control; and constant temperature and humidity shall be maintained.

(ii) Examine the test samples of insulation and the control at 40X magnification for evidence of fungal growth.

(iii) Ascertain whether any of the test samples show more fungal growth than the control.

(4) At a minimum each bag of thermal insulation shall be permanently marked with the following information:

(i) Name of manufacturer.

(ii) Recommended method of application (blowing or pouring).

(iii) Minimum net weight of insulation.

(iv) Table I, filled in. Where the insulation is intended for application by both blowing or pouring, the bag shall have a separate coverage chart for each type of application if the coverage is different.

(v) The following warning statements:

Skin irritation: During installation, insulation material can cause some local skin irritation; protect skin by wearing loose clothing, including gloves. Wash work clothing separately from other clothing.

Eye and lung protection: To prevent irritation to eyes and lungs from fibers which may become airborne during installation, a dust mask and goggles are suggested.

**Table I.**—*Coverage Chart*

| To obtain thermal resistance (R-value) of | Minimum number of bags per 1,000 ft² (MSF net) | Installed insulation should not be less than: | Maximum net square feet coverage per bag | The weight per net square foot of installed insulation should be not less than: |
|---|---|---|---|---|
| Attic: | | | | |
| R–40 | —bags/MSF | —inches thick | —sq. ft. | —lbs/sq. ft. |
| R–32 | — bags/MSF | — inches thick | — sq. ft. | — lbs/sq. ft. |
| R–24 | — bags/MSF | — inches thick | — sq. ft. | — lbs/sq. ft. |
| R–19 | — bags/MSF | — inches thick | — sq. ft. | — lbs/sq. ft. |
| R–13 | — bags/MSF | — inches thick | — sq. ft. | — lbs/sq. ft. |
| Sidewalls:* | | | | |
| R— | — bags/MSF | 2 inches thick (nominal) | — sq. ft. | — lbs/sq. ft. |
| R— | — bags/MSF | 4 inches thick (nominal) | — sq. ft. | — lbs/sq. ft. |
| R— | — bags/MSF | 6 inches thick (nominal) | — sq. ft. | — lbs/sq. ft. |

*The thermal resistance of loose-fill cellulose thermal insulation shall be measured at the manufacturer's recommended installed density.

**Table II.**—*Coverage Chart*

| To obtain thermal resistance (Re-value) of | Minimum number of bags per 1,000 ft² (MSF net) | Installed insulation should not be less than: | Maximum net square feet coverage per bag | The weight per net square foot of installed insulation should be not less than: |
|---|---|---|---|---|
| Attic: | | | | |
| R–22 | — bags/MSF | — inches thick | — sq. ft. | — lbs/sq. ft. |
| R–19 | — bags/MSF | — inches thick | — sq. ft. | — lbs/sq. ft. |
| R–11 | — bags/MSF | — inches thick | — sq. ft. | — lbs/sq. ft. |
| Sidewalls:* | | | | |
| R— | — bags/MSF | 2 inches thick (nominal) | — sq. ft. | — lbs/sq. ft. |
| R— | — bags/MSF | 4 inches thick (nominal) | — sq. ft. | — lbs/sq. ft. |
| R— | — bags/MSF | 6 inches thick (nominal) | — sq. ft. | — lbs/sq. ft. |

*The thermal resistance of insulation shall be measured at the manufacturer's recommended installed density.

**§ 456.804 Standard for loose-fill mineral fiber thermal insulation.**

(a) *Scope.* This section applies to loose-fill mineral fiber insulation.

(b) *Material Requirements.*

(1) For fire safety, the material shall meet CPSC Part 1209 when tested at the manufacturer's recommended installed density.

(2) For corrosiveness, the material shall meet the requirements of HH–I–1030A.

(3) For odor emission, the material shall meet the requirements of HH–I–515D.

(4) For fungi resistance, the material shall meet the requirements of HH–I–515D, with the changes specified in § 456.803(b)(3).

(5) The weight loss on ignition shall be no greater than 12 percent when tested in accordance with HH–I–1030A.

(6) At a minimum, each bag of insulation shall be permanently marked in accordance with CPSC Part 1404 (without the word: "cellulose"), and shall include the following information:

(i) Name of manufacturer.

(ii) Recommended method of application (blowing or pouring).

(iii) Minimum net weight of insulation.

(iv) Table II, filled in. Where the insulation is intended for application by both blowing or pouring, the bag shall have a separate coverage chart for each type of application, if coverage is different.

(v) The following warning statements:

Skin irritation: During installation, insulation material can cause some local skin irritation; protect skin by wearing loose clothing, including gloves. Wash work clothing separately from other clothing.

Eye and lung protection: To prevent irritation to eyes and lungs from fibers which may become airborne during installation, a dust mask and goggles are suggested.

**§ 456.805 Standard for mineral fiber blanket and batt thermal insulation.**

(a) *Scope.* This section applies to mineral fiber blanket and batt thermal insulation for residential applications.

(b) *Material Requirements.* (1) For fire safety, the material shall meet the requirements CPSC Part 1209.

(i) For critical radiant flux test, blankets and batts with a reflective or nonreflective membrane covering on one principal face (known as Type I) shall be tested with the membrane covering faced down in the tray. Blankets and batts with a reflective or nonreflective membrane covering on both principal faces, only one of which shall be a vapor barrier (known as Type III) shall be tested with the breather paper faced up in the tray.

(ii) For smoldering combustion test, the mineral fiber blanket shall be tested without the membrane at the recovered thickness.

(2) For corrosiveness, the material shall meet the requirements of HH–I–1030A.

(3) For odor emission, the material shall meet the requirements of HH–I–515D.

(4) For fungi resistance, the material shall meet the requirements of HH–I–515D with the changes specified in § 456.803(b)(3).

(5) Vapor permeance.

(i) Vapor resistant membrane coverings on mineral fiber blanket and batt thermal insulation shall have a vapor permeance of not more than 1.0

perm. This shall be verified by testing in accordance with Procedure A of ASTM E 96.

(ii) Vapor permeable membrane coverings on mineral fiber blanket and batt thermal insulation shall have a vapor permeance of not less than five perms. This shall be verified by testing in accordance with Procedure A of ASTM E 96.

(6) Dimensional Tolerances. The dimensional tolerance on a specified length of mineral fiber blanket or batt thermal insulation shall be 12.5 mm (0.5 inch) for blankets 2,500 mm (100 inches) or shorter, and 0.5 percent for blankets longer than 2,500 mm. The tolerance on a specified width shall be 12.5 mm (0.5 inch).

(7) At a minimum, mineral fiber blanket and batt thermal insulation shall be permanently marked in accordance with CPSC Part 1404 (without the word "cellulose"), and shall include the following information:

(i) The following statement shall be permanently marked on applicable insulation:

**Caution**

This membrane covering is flammable. It should not be left exposed.

(ii) The following warning statements shall be marked on the insulation or its packaging:

Skin irritation: During installation, insulation material can cause some local skin irritation; protect skin by wearing loose clothing, including gloves. Wash work clothing separately from other clothing.

Eye and lung protection: To prevent irritation to eyes and lungs from fibers which may become airborne during installation, a dust mask and goggles are suggested.

**§ 456.806 Standard for vermiculite thermal insulation.**

(a) *Scope.* This section applies to expanded or exfoliated vermiculite thermal insulating materials.

(b) *Material Requirements.* (1) For fire safety, the material shall meet the combustibility requirements of HH–I–585C.

(2) For water repellency, the material shall meet the requirements of HH–I–585C.

(3) Density shall be less than 88 kg/m$^3$ (5.5 lb/ft$^3$) when tested in accordance with ASTM C–520.

(4) Grading. Particle size of vermiculite insulation shall be graded to meet the requirements of ASTM C516.

(5) At a minimum, each bag of vermiculite thermal insulation shall be permanently marked in accordance with CPSC Part 1404 (without the word "cellulose"), and shall include the following information:

(i) Name of manufacturer.

(ii) The density and grade of vermiculite.

(iii) Minimum net weight of insulation.

(iv) Recommended method of application (blowing or pouring)

(v) Table II, filled in. Where insulation is intended for application by both blowing and pouring, the bag shall have a separate coverage chart for each type of application of the coverage is different.

(vi) The following warning statement:

Eye and lung protection: To prevent irritation to eyes and lungs from particles which may become airborne during installation, a dust mask and goggles are suggested.

**§ 456.807 Standard for perlite thermal insulation.**

(a) *Scope.* This section applies to loose-fill perlite thermal insulation.

(b) *Material Requirements.* (1) For fire safety (combustibility), water repellency, and solvent solubles, the material shall meet the requirements of HH–I–574B.

(2) Density. The material shall have a density of not more than 128 kg/m$^3$ (8 lb/ft$^3$), when tested in accordance with ASTM C 520.

(3) Grading. Particle size of perlite insulation shall be graded to meet the requirements of HH–I–574B.

(4) Marking. Each bag of perlite thermal insulation shall be permanently marked in accordance with CPSC Part 1404 (without the word, "cellulose"), and shall include the following information:

(i) Name of manufacturer.

(ii) Density and grade of perlite.

(iii) Minimum net weight of insulation.

(iv) Recommended method of application (blowing or pouring).

(v) Table II, filled in. Where insulation is intended for application by both blowing and pouring, the bag shall have a separate coverage chart for each type of application if the coverage is different.

(vi) The following warning statement.

Eye and lung protection: To prevent irritation to eyes and lungs from particles which may become airborne during installation, a dust mask and goggles are suggested.

**§ 456.808 Standards for polystyrene thermal insulation board.**

(a) *Scope.* This section covers cellular polystyrene thermal insulation board.

(b) *Material Requirements.* (1) Fire safety. Polystyrene thermal insulation shall have a flame spread classification of no greater than 75 when tested in accordance with ASTM E 84.

(2) For water absorption, water vapor transmission, compressive strength and fluxural strength, the material shall meet the requirements of HH–I–524B.

(3) Dimensional tolerances. The dimensional tolerances of the material shall comform to the values in Table 3 of ASTM C 578.

(4) At a minimum, each package of polystyrene thermal insulation board shall be permanently marked to include the following information:

(i) Name of manufacturer

(ii) The type of insulation (as defined in HH–I–524B)

(iii) And the following statements:

Interior applications of polystyrene thermal insulation board must be covered with a layer of gypsum board 12.5 mm (0.5 inches) thick, or an equivalent fire barrier.

Keep this insulation away from exhaust flues of furnaces, water heaters, space heaters, or other heat-producing devices.

**§ 456.809 Standards for polyurethane and polyisocyanurate thermal insulation board.**

(a) *Scope.* This section applies to faced and unfaced rigid cellular polyurethane and polyisocyanurate thermal insulation board.

(b) *Material Requirements.* (1) Fire safety. The flame spread classification of polyurethane and polyisocyanurate insulation board shall be no greater than 75 when tested in accordance with ASTM E 84.

(2) For water absorption, compressive strength flexural strength, dimensional tolerance, and moisture vapor permeability, the material shall meet the requirements of HH–I–530 A.

(3) At a minimum, each package of polyurethane and polyisocyanurate thermal insulation shall be permanently marked to include the following information:

(i) Name of manufacturer

(ii) And the following statements:

Interior applications are limited to spaces separated from the living space by a 12.5 mm (0.5 inch) thick layer of gypsum board, or an equivalent fire barrier.

Keep this insulation away from exhaust flue of furnaces, water heaters, space heaters, or other heat-producing devices.

**§ 456.810 Standard for urea-formaldehyde based foamed-in-place insulation. [Reserved]**

**§ 456.811 Standards for aluminum foil reflective thermal insulation.**

(a) *Scope.* This section applies to single and multilayer aluminum reflective thermal insulation.

(b) *Material Requirements.* (1) For water vapor permeability, pliability, thickness, bonding adhesive, content of foil, and kraft paper, the material shall meet the requirements of HH–I–1252B.

(2) Finished insulation. The layers shall be securely bonded together along edges, forming an attachment flap suitable for nailing or stapling.

(3) At a minimum, each package of aluminum foil thermal insulation shall be permanently marked in accordance with CPSC Part 1404 (without the word "cellulose") and shall include the following information:

(i) Name of manufacturer.

**§ 456.812 Standards for caulks and sealants, water heater insulation and heating/air conditioning duct insulation.**

(a) *Scope.* This section applies to the following materials of components thereof:

(1) Caulks and sealants.

(2) Water heater insulation.

(3) Heating and air conditioning duct insulation.

(b) *Materials Standards for Caulks and Sealants.* (1) Caulks and sealants shall conform to the applicable Federal Specifications and ASTM standards indicated in Table III.

**Table III**

| Examples of caulks or sealants | Applicable specification |
|---|---|
| Putty | F.S. TT-P-00791B–modified to allow natural calcium carbonate. |
| Oil and Resin Base | F.S. TT–C–00598C and ASTM C–570–72. |
| Acrylic (Solvent Type) | F.S. TT–S–00230C. |
| Butyl Rubber | F.S. TT–S–001657. |
| Chlorosulphonated Polyethylene. | F.S. TT–S–00230C. |
| Latex Sealing Compound | ASTM C 834–76. |
| Polysulfide-single-component | F.S. TT–S–00230C. |
| Polysulfide-multicomponent | F.S. TT–S–00227E |
| Polyurethane-singlecomponent. | F.S. TT–S–00230C. |
| Polyurethane-multicomponent. | F.S. TT–S–00227E. |
| Silicone | F.S. TT–S–001543A |

(c) *Material Standard for Water Heater Insulation.* (1) Water Heater Insulation shall conform to Federal Specification HH–I–558B, "Federal Specification: Insulation Blocks, Boards, Blankets, Felts, Sleeving, and Pipe Fitting Covering." In addition, the exterior facing shall have a flame spread, when tested in accordance with ASTM–E–84, of:

(i) No more than 150 when installed on electric water heaters, and

(ii) No more than 25 when installed on gas or oil-fired water heaters.

(2) If insulation is packaged specifically for the purpose of insulating water heaters, it shall be marked with the following information: R-value, length, width, thickness, square feet of insulation in the package, and flame spread of the facing.

(3) Mineral fiber insulation which meets the requirements of paragraph (c)(1) of this section, but which is not packaged specifically for the purpose of insulating water heaters may be labelled "Conforms to DOE standards for water heater insulation". In addition, it shall also be marked with the following: R-value and flame spread of facing.

(d) *Material Standard for Heating/Air Conditioning Ducts Insulation.* (1) Water heater and heating/air conditioning duct insulation shall conform to F.S. HH–I–558B, "Federal Specification: Insulation Blocks, Boards, Blankets, Felts, Sleeving, and Pipe Fitting Covering."

(2) Duct coverings shall have a flame spread, when tested in accordance with ASTM E–84, of no more than 25.

(3) Packages of duct insulation shall be marked with the following information: the R-value, length, width, thickness, and square feet of insulation in the package.

**§ 456.813 Standards for storm and thermal windows and doors and multiglazed insulating units for windows and doors.**

(a) *Scope.* This section applies to the following materials or components thereof:

(1) Storm and thermal windows

(2) Storm and thermal doors

(3) Multiglazing units for windows and doors.

(b) *Material Standards for Storm and Thermal Windows.* (1) Aluminum combination storm windows shall conform to ANSI/AAMA 1002.9–1977, "Voluntary Specification for Aluminum Combination Storm Windows for External Applications." Cl.3, Cl.4, and C1.6 of ANSI/AAMA 1002.9–1977, may be modified to permit plastic as well as glass.

(2) Wood frame storm and thermal windows shall conform to Section 3 of ANSI/NWMA I.S. 2–73, "Industry Standard for Wood Windows," modified to allow plastic as well as glass.

(3) Rigid vinyl frame storm and thermal windows shall be constructed with vinyl profile extrusions which conform to NBS/PS26–70, "Rigid Polyvinyl-Chloride Profile Extrusions."

(4) Rigid acrylic frame storm windows shall conform to the requirements in the BOCA research report No. 72–33 for thermoplastic molding powders VS, VM, or DR.

(5) Exterior storm windows shall have an air infiltration no greater than 0.003 $m^3/s$ for each linear meter (2.0 $ft^3$/min for each linear foot) of crack at a static pressure difference of 75 Pa (1.56 psf). Interior storm windows shall have an air infiltration no greater than 0.00075 $m^3/s$ for each linear meter (0.5 $ft^3$/min for each linear foot) of crack at a static pressure difference of 75 Pa (1.56 psf).

(6) Thermal windows shall have a thermal conductance no greater than 4 $W/m^2°C$ (0.7 Btu/h $ft^2$ °F) corrected for framing, for an exterior wind velocity of 24 km/h (15 mph) and an infiltration rate no greater than 0.00075 $m^3/c$ for each linear meter (0.5 $ft^3$/min for each linear foot of crack at a static pressure difference of 75 Pa (1.56 psf).

(7) Infiltration through storm and thermal windows shall be measured in accordance with ASTM E 283–73, "Standard Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors." Heat transmission factors of thermal windows shall be measured in accordance with ASTM C 236. Framing correction factors shall be taken from ASHRAE Handbook 1977 Fundamentals, p. 22.24, Table 8.

(c) *Material Standards for Storm and Thermal Doors.* (1) Aluminum frame storm doors shall conform to ANSI/AAMA 1102.7–1977, "Voluntary Specifications for Aluminum Storm Doors."

(2) Pine storm and thermal doors shall conform to the requirements for exterior doors listed in Section 3 of ANSI/NWMA I.S. 5–73, entitled "Ponderosa Pine Doors."

(3) Fir, hemlock, and spruce storm and thermal doors shall conform to the requirements for exterior doors listed in Section 3 of FHDA 6–77, "Industry Standard for Douglas-Fir, Western Hemlock, and Sitka Spruce Doors and Blinds."

(4) Rigid vinyl frame storm and thermal doors shall be constructed with vinyl profile extrusions which conform to NBS/PS 26–70.

(5) If storm or thermal doors contain glazing, safety glazing shall conform to CPSC safety standard Part 1201—"Safety Standard for Architectural Glazing Materials."

(d) *Material Standard for Multi-Glazing.* (1) The frost point of each test specimen sealed insulating glass unit shall be no higher than −29°C (−20°F) when tested in accordance with ASTM–E–576–76.

(2) Sealed insulating glass units, when used in doors, shall conform to CPSC Part 1201.

**§ 456.814 Standards for furnace efficiency modifications.**

(a) *Scope.* This section applies to the following furnace efficiency modifications:

(1) Replacement gas-fired central heating systems.

(2) Replacement oil-fired central heating systems.

(3) Heat Pumps.

(4) Replacement oil burners.

(5) Electrically-operated vent dampers for gas-fired systems.

(6) Mechanically actuated vent dampers for gas-fired systems.

(7) Thermally actuated vent dampers for gas-fired systems.

(8) Automatic gas ignition systems.

(b) *Material Standard for Replacement Gas-Fired Central Heating Systems.* Gas-Fired central heating systems shall conform to ANSI Z21.46–1978, entitled, "American National Standard for Gas-fired Central Furnaces," ANSI Z21.13 1977, entitled "Gas-Fired Low Pressure Steam and Hot Water Heating Boilers," or ANSI Z21.59–1974, "Gas-Fired High Pressure Steam and Hot Water Heating Boilers."

(c) *Material Standard for Replacement Oil-Fired Central Heating Systems.* Oil-Fired central heating systems shall conform to UL 726/ANSI Z96.3–1975 "Oil-Fired Boiler Assemblies" or UL 727/ANSI Z96.1–1978 "Oil-fired Central Furnaces."

(d) *Material Standard for Replacement Oil Burners.* Oil burners shall conform to UL 296/ANSI Z96.2–1974 "Oil Burners" and ANSI Z91.2–1976, entitled "Performance Requirements for Automatic Pressure Oil Burners of the Mechanical-Draft Type."

(e) *Material Standard for Heat Pumps.* Heat pumps shall conform to UL 599 "Standard for Heat Pumps."

(f) *Material Standard for Automatic Ignition Systems for Gas-Fired Heating Systems.* Automatic ignition systems shall conform to ANSI Z21.20–1975, entitled "American National Standard for Automatic Gas Ignition Systems and Components." All automatic gas ignition systems shall contain a label stating: "This device should be installed only by an approved contractor."

(g) *Material Standard for Vent Dampers for Gas-Fired Systems.* (1) Vent Dampers for gas-fired systems shall meet the appropriate standard(s) listed below:

(i) ANSI Z21.66–1977, American National Standard for Electrically Operated Automatic Vent Damper Devices for Use with Gas-Fired Appliances.

(ii) ANSI XZ21.67–1978, American National Standard for Mechanically Actuated Automatic Vent Damper Devices for use with Gas Fired Appliances.

(iii) ANSI Z21.68–1978, American National Standard for Thermally Actuated Automatic Vent Damper Devices for use with Gas-Fired Appliances.

(2) All vent dampers shall contain a label stating: "This device should be installed only by an approved contractor."

(3) Wiring diagrams and instructions. [Reserved.]

**§ 456.815 Load management devices.**

(a) *Scope.* This section applies to devices associated with load management techniques. Application of load management technology in the United States is expected to expand rapidly. Consensus specifications for load management devices are likely to become available in the future as their use becomes more common.

(1) *General.* (i) It shall be suitable for its intended purpose.

(ii) Claims of its performance shall be substantiated by certified test data on production models.

(iii) It shall be listed by a nationally recognized laboratory.

(iv) It shall not be incompatible with the utility's control equipment, where relevant.

(v) It shall be constructed of substantial and compatible materials.

(vi) Where required for safety, warning decals, safety locking, and automatic shut-off devices shall be used.

(vii) It shall not cause improper functioning of other household appliances.

(2) The manufacturers shall maintain a suitable quality control program to ensure that all component parts, as well as the finished product, will conform to all of the manufacturer's efficiency, performance, and safety claims.

(3) The manufacturer shall provide detailed installation and general maintenance instructions with each unit.

(4) The manufacturer shall provide a warranty for the device which covers a period of at least three years.

## Subpart I—Energy Conservation Installation Standards

**§ 456.901 Scope.**

This subpart contains the installation standards, referred to herein as standard practices, for the safe and effective installation of energy conservation measures under the RCS program. Certain standards are incorporated by reference into this Subpart as though set forth in full herein, pursuant to 5 U.S.C. § 552(a). Identification, description, and information regarding availability of and future changes to the incorporated standards are contained in Appendix II to this Part.

**§ 456.902 Referenced standards.**

The standard practices of this Subpart contain references to existing ASTM (American Society for Testing and Materials), ANSI (American National Standards Institute) and NFPA (National Fire Protection Association) standards. These referenced standards are listed below.

(a) ASTM Designation C 168–67 means "Standard Definitions of Terms Relating to Thermal Insulation Materials."

(b) ASTM Designation C 755–73 means "Standard Recommended Practice for Selection of Vapor Barriers for Thermal Insulation."

(c) ASTM Designation E 84–77 means "Standard Test Method for Surface Burning Characteristics of Building Materials."

(d) ASTM Designation E 119–76 means "Standard Methods of Fire Tests of Building Construction and Materials."

(e) ASTM Designation E 136–79 means "Test for Non-Combustibility of Elementary Materials."

(f) ANSI/ASTM D2156–65 (1975) means "American National Standard Method of Tests for Smoke Density in the Flue Gases from Distillate Fuels."

(g) ANSI Z91.2–1976 means "American National Standard Performance Requirements for Automatic Pressure Atomizing Oil Burners of the Mechanical Draft Type."

(h) ANSI Z95.1–1974 means "American National Standard Installation of Oil Burning Equipment."

(i) ANSI Z96.2–1974 (UL 296–Sept. 1974) means "American National Standard Safety Standard for Oil Burners."

(j) NFPA–31 means "Standard for the Installation of Oil Burning Equipment."

(k) NFPA–54 means "National Fuel Gas Code."

(l) NFPA–70 means "National Electrical Code."

(m) NFPA–211 means "Standard for Chimneys, Fireplaces, and Vents."

**§ 456.903 Definitions.**

(a) Certain technical terms relating to insulation not defined below are used in this subpart in accordance with the definitions given in ASTM Designation C 168–67, "Standard Definitions of Terms Relating to Thermal Insulating Materials."

(b) As used in this subpart—

(1) "Approved" means acceptable to whatever authority regulates the installation procedures discussed in this practice. Such authority is usually a municipal, state, or federal agency or an underwriters' inspection or rating bureau.

(2) "Conditioned Space" means any space in a residential building which is served by a heating or cooling system.

(3) "Draft Hood" means a component of gas-fired water heaters which mixes secondary air with the combustion gases leaving the unit thus enabling a smooth, continuous relief of gases up the vent pipe.

(4) "Draft Regulator" means a component of oil-fired water heaters which mixes secondary air with the combustion gases leaving the unit thus enabling a smooth, continuous relief of gases up the vent pipe.

(5) "Duct Insulation" means mineral fiber batt and blanket thermal insulation with a membrane which has a frame spread classification of no more than 25 when tested in accordance with ASTM Designation E 84–77.

(6) "Galvanic Corrosion" means a form of deterioration resulting from the electrochemical reaction that occurs when certain dissimilar metals are in contact.

(7) "Hi-Limit Switch" means a temperature control that senses temperature changes in electric, gas, and oil-fired water heaters and cuts off the energy supply or fuel flow to the unit when the internal water temperature rises above a certain point.

(8) "Mastic" means a pasty material used as a adhesive for installing insulation board.

(9) "Mineral Cellular Loose-fill Thermal Insulating Materials" means mineral particulate material in granular, modular, powdery, or similar form designed to be installed dry by pouring, blowing, or hand placement between retaining surfaces or as a covering layer.

(10) "Mineral Fiber Batt and Blanket Thermal Insulating Materials" means flexible units composed of felted inorganic fibers with or without binders, in rolls or strips, with or without attached membrane coverings.

(11) "Mineral Fiber Loose-fill Thermal Insulating Material" means insulation composed of mineral substances such as slag, rock, or glass suitable for pneumatic or poured application.

(12) "Multi-glazing" means an arrangement of two or more separated layers of glazing (providing one or more insulating air spaces). Multi-glazing can be achieved by installing a preassembled, sealed insulating glass unit or by affixing one or more additional sheets of glazing onto an existing window, sash, or glass.

(13) "Oil Burner" means a device which, for oil-fired heating equipment in a residential building, atomizes, vaporizes, or otherwise disperses the fuel oil, mixes it with air and ignites the fuel-air mixture, and is an integral part of an oil-fired furnace or boiler, including the combustion chamber.

(14) "Organic Cellular Rigid Board Thermal Insulation" means an organic foam composed principally of polymerized styrene resin or catalyzed reaction products expanded with a fluorocabon blowing agent to form a homogeneous rigid mass of cells.

(15) "Organic (Cellulosic or wood fiber) Loose-fill Thermal Insulating Materials" means thermal insulation composed of chemically treated cellulosic or wood fibers, or any combination thereof suitable for pneumatic or poured application.

(16) "Pressure Relief Valve" means a safety valve which opens to vent pressure when the pressure in the water tank exceeds a pre-set level due to excessive water temperature.

(17) "Prime Window (door)" means the original window (door) to which a storm window (door) or multi-glazing is added to provide greater thermal resistance.

(18) "Reflective Thermal Insulation" means thermal insulation depending for its efficiency in large part on reduction of radiant heat transfer across spaces by use of one or more surfaces of high reflectance and low emittance.

(19) "Replacement Oil Burner" means an oil burner that conforms to the requirements of the most recent revisions of American National Standard Safety Standard for Oil Burners, Z96.2 (UL 296) and American National Standard Performance Requirements for Automatic Pressure Atomizing Oil Burners of the Mechanical Draft Type, Z91.2 and approved by a nationally recognized testing agency.

(20) "Storm Door" means a door installed outside or inside a prime door, creating an insulating air space to provide greater resistance to heat flow than the prime door alone.

(21) "Storm Window" means a unit consisting of glazing installed in a window opening either outside or inside a prime window, creating an insulating air space to provide greater resistance to heat flow than the prime window alone. The storm window may be removable or permanently attached.

(22) "Thermal Door" means a unit installed in a door opening which has an R-value of at least two (2) and is weatherstripped to provide greater resistance to heat flow.

(23) "Thermal Window" means a window system with improved thermal performance through the use of multiple glazing, and more airtight construction. Some thermal windows also provide an insulating frame and sash to provide greater thermal efficiency.

(24) "Unconditioned Space" means any space, out-of-doors or in a residential building, which is not served by a heating or cooling system.

(25) "Unit" means a storm window, thermal window, multi-glazing or storm door as defined herein. It is a manufactured item assembled in a factory or a knock down unit assembled at the site prior to installation.

(26) "Vapor Barrier" means any material (as defined in ASTM Designation C 755–73) that has a water vapor permeance (perm) rating of one (1) or less.

**Note 1.**—The following materials, upon proper application, constitute vapor barriers. Asphalt impregnated draft paper, aluminum foil, plastic film, and paint and wallcoverings which are labeled by the manufacturer as having a perm rating of one (1) or less when applied in accordance with the manufacturer's instructions.

(27) "Vent Pipe" means an exhaust pipe carrying products of combustion from oil-fired and gas-fired water heaters to the outside environment.

(28) "Water Heater Insulation" means mineral fiber batt and blanket thermal insulation with a membrane facing which has a frame spread classification of no more than 150 for electric water heaters and 25 for oil- and gas-fired water heaters, when tested in accordance with ASTM Designation E 84–77.

(29) "Water Heater Damper" means a device which automatically closes vents on oil and gas-fired water heaters to prevent the escape of heat through the vent pipe when the main burner is not being fired.

**§ 456.904 Coverage and additional requirements.**

(a) *Coverage.* (1) Installation of any measure or type of measure for which a standard exists in this Subpart, installed under the circumstances described in the State Plan pursuant to § 456.305, shall conform to that standard, except to the extent otherwise provided in paragraphs (a) (2) and (3) of this section.

(2) These practices are intended to establish a minimum level of performance for safety and effectiveness. When a manufacturer's installation instructions regarding specific requirements that affect safety and effectiveness result in a higher level of performance for these characteristics, such manufacturer's installation instructions may, with the approval of the Assistant Secretary, be used.

(3) These practices are not intended to supersede the authority of state and local codes but are instead intended to establish minimum criteria for safety and effectiveness. When state or local codes specifically address the substance of provisions contained therein, they may apply; when state and local codes do not address the substance of specific provisions contained therein, these practices shall prevail.

(b) *Additional requirements.* (1) At the completion of each installation of

thermal insulation materials covered under §§ 456.905–456.909, the person responsible for such installation shall comply with the requirements of § 456.910, "Certification Procedures for the Installation of Thermal Insulation Materials."

(2) The installation practices in this Subpart contain certain "recommendations" regarding the application of vapor barriers in some condensation zones. The term "recommend" is used to signify that the procedures identified are not required to provide a safe and effective installation of insulation in every instance but may prevent the occurrence of moisture problems under certain conditions. The eligible customer ultimately needs to accept or reject the "recommended" practices contained herein. Therefore, whenever a "recommendation" is contained in these practices, the person responsible for the installation shall present to the eligible customer the "recommendation" and any additional information which he can provide to assist the eligible customer in making a decision.

**§ 456.905 Standard practice for the installation of loose-fill thermal insulation.**

(a) *Scope.* (1) This practice covers the installation of dry organic (cellulosic or wood) and mineral (rock, slag, or glass) fiber loose-fill thermal insulation on ceilings, attics, floors and in frame wall cavities and mineral cellular (perlite or vermiculite) loose-fill thermal insulation in attic floors and various masonry wall cavities of existing residential buildings.

(2) A working knowledge of the terminology and fundamentals of construction, and applicable codes is necessary for the proper application of this standard.

(b) *Safety Precautions.* During installation, do not smoke in the attic or any truck or van used for installation.

(c) *Pre-Installation Procedures.* (1) General. (i) Identify all recessed lighting fixtures (including wiring compartments and ballasts) furnaces, vents, chimneys, and other heat-producing devices in all areas where insulation is to be installed.

(ii) Install blocking, such as wood, metal or unfaced mineral wool batts around all heat producing devices to permanently maintain the clearances specified in paragraphs (c) (1) (iii) and (iv) of this section. Install all blocking at least as high as the height of the finished insulation and in a manner that ensures that all devices which may require maintenance or servicing remain accessible after the insulation is installed.

(iii) Install blocking to provide a three-inch minimum clearance around all recessed lighting fixtures (including wiring compartments and ballasts) and other heat producing devices not covered in paragraph (c) (1) (iv) of this section. Do not cover these devices so as to entrap heat or prevent the free circulation of air unless they are approved for the purpose.

(iv) Install blocking around gas-fired appliances to provide the minimum clearances specified in NFPA–54, the National Fuel Gas Code. Install blocking around oil-fired appliances to provide the minimum clearances specified in NFPA–31, Standard for the Installation of Oil Burning Equipment. Install blocking around masonry chimneys or masonry enclosing a flue to provide a minimum two-inch (50 mm) clearance from the outside face of the masonry. Install blocking around vents, chimney and vent connectors and chimneys other than masonry chimneys, to provide the minimum clearances specified in NFPA–211, Standard for Chimneys, Fireplaces, and Vents.

(v) When installing mineral fiber or mineral cellular insulation which, in addition to meeting all the requirements specified in § 456.804, is also non-combustible as defined in ASTM designation E 136–79, the blocking and airspaces around vents and chimneys need not be provided.

(vi) Inspect the roof, walls, ceilings, and attic floors to identify areas where a previous moisture problem has caused paint peeling, warpage, stain, visible fungus growth, rotting, or other structural damage. Do not install insulation in such areas until the resident has been informed and these conditions have been corrected and their source(s) eliminated. If the resident, after being informed of the moisture condition and the effect of installing insulation in such areas, elects to proceed with the insulation, the resident must so state in writing on the contract.

(vii) Block all openings in ceilings, floors, and sidewalls through which the insulating material may escape. Seal all wall cavities which open into a basement or crawl space before wall insulation is installed.

(2) *Walls.* (i) For buildings located in Zone I of Figure 1, provide a vapor barrier on the interior surface of all walls to be insulated in bathrooms and unvented kitchens and laundry areas. Caulk or seal all major cracks on the interior face of exterior walls of these rooms including joints between the floor and wall (except where impractical because of carpeting), between wall and ceiling, at joints around window frames, and around wall penetrations for electrical services (outlets and switches) and plumbing stacks, and heating and air-conditioning ducts.

**Note 1.**—It is recommended that a vapor barrier and caulking, such as described in this section, also be provided on all walls to be insulated in bathrooms and unvented kitchens and laundry areas in buildings in Zone II of Figure 1.

**Note 2.**—The above requirements for moisture control are minimum requirements needed to prevent long term moisture damage. Homes which are characterized by one or more of the following conditions are more likely to experience excessive moisture accumulation which can be corrected by application of a vapor barrier and caulking as described above and/or additional venting of the wall cavity from the exterior or additional ventilation of the occupied space:

a. Homes with an area of less than 800 square feet (75 square meters);
b. Homes with less than 250 square feet (23 square meters) per occupant;
c. Homes with tight wall and ceiling construction and weatherstripped windows and doors;
d. Electrically heated homes or homes with a heating system which uses outside combustion air.

A relative humidity indicator may be installed to monitor the humidity level and determine when excessive moisture accumulation is likely to occur.

(3) *Attics and Ceilings.* (i) Identify and measure ventilation area in attics. Do not install insulation in attics unless ventilation openings in attic areas conform to one of the following requirements:

(A) 1 ft 2 ($0.1 m^2$) minimum of free ventilation area per 150 $ft^2$ ($15 m^2$) of attic floor area, if no vapor barrier exists in the attic;

Figure 1. Condensation Zones in the United States

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(B) 1 ft 2 ($0.1m^2$) minimum of free ventilation are per 300 ft ($30 m^2$) of attic floor area if a vapor barrier does exist;

(C) 1 $ft^2$ ($0.1m^2$) minimum of free ventilation area per 300 $ft^2$ ($30 m^2$) of attic floor space if at least 50 percent of the required ventilating area is provided with fixed ventilation located in the upper portion of the space to be ventilated (at least three feet (900 mm) above eave or soffit vents) with the remainder of the required ventilation provided by eave or soffit vents, if no vapor barrier exists. If the free ventilation area of louvers is not known, assume that it is half of the area of the ventilation opening and increase the opening accordingly.

(ii) Ensure that all ventilation openings have suitable louvers or screens to prevent rain or snow from entering the attic.

(iii) For buildings located in Zone I of Figure 1, if there is no existing insulation or if existing insulation is to be removed, provide a vapor barrier membrane on the upper surface of the ceiling material. Never install a vapor barrier on top of existing insulation.

Note 3.—For buildings in Zones I and II of Figure 1, where there is existing ceiling insulation and no vapor barrier, it is recommended that a vapor barrier such as paints and wall coverings which are labeled by the manufacturer as having a perm rating of one (1) or less and are applied in strict accordance to the manufacturer's instructions be installed on the interior ceiling surface of bathrooms and unvented kitchens and laundry areas. It is also recommended that all cracks and penetrations on the interior ceiling surface of these rooms (such as around lighting fixtures and at wall and ceiling joints) be caulked.

Note 4.—The above requirements for ventilation and moisture control are minimum requirements needed to prevent long term

moisture damage. Homes which are characterized by one or more of a, b, c, or d of Note 2 are more likely to experience excessive moisture accumulation which can be corrected by application of a vapor barrier and caulking as described above or by additional ventilation of the occupied space.

A relative humidity indicator may be installed to monitor the humidity level and determine when excessive moisture accumulation is likely to occur.

(iv) Install permanent blocking around attic trap doors and vents which open into the attic, if the level to which the insulation will be installed exceeds their height. Ensure that the blocking is installed around vent openings in a manner that enables the free movement of air through the vent into the attic.

(v) Cover all bathroom and kitchen vent openings in the attic with temporary blockings prior to the installation of insulation to assure that no insulation material falls into the vents.

(vi) Install permanent blockings to restrain loose-fill insulation from clogging soffit vents at the eaves restricting attic ventilation. Install blocking so as to ensure free movement of air through soffit vents into the attic.

(d) *Installation Procedures.* (1) General.

(i) Do not install insulation unless the pre-installation procedures have been carried out and any defects which were identified were corrected and their causes eliminated.

(ii) Structural loads [Reseved].

(iii) Handle all insulation material in accordance with manufacturer's instructions and keep it dry and free of extraneous materials.

(iv) For pneumatic installation use only equipment compatible with the insulation material and operate the equipment in accordance with the manufacturer's instructions.

(v) Install insulation so that it will not be in contact with the ground or other sources of water.

(vi) Install insulation only between conditioned and unconditioned spaces.

(2) *Walls.* (i) Do not fill wall cavities which themselves are air ducts for heating, ventilation, and/or cooling systems.

(ii) Locate entry holes in walls (if required) to permit the complete filling of wall cavities.

(iii) After the entry holes have been opened use them to check the wall cavity for fire stops and other obstructions which will necessitate additional entry holes to assure complete filling of the cavity.

(iv) With the exception of spaces identified in paragraphs (c)(1) (iii) and (iv) of this section, completely fill wall cavities in accordance with the manufacturer's recommendations.

(v) Close all entry holes in a workmanlike manner using materials compatible with the original materials. Do not close entry holes in sheething which is covered by an exterior brick veneer or siding.

(3) *Attics and Ceilings.* (i) For penumatic installation in ceiling areas use the least air pressure meeting the manufacturer's instructions.

(ii) Do not blow insulation into electrical devices or vents which open into the attic or other spaces identified in paragraphs (c)(1) (iii) and (iv) of this section.

(iii) Fit the attic side of trap doors or panels with insulation batt (or equivalent material) except where prevented by a retractable ladder.

(e) *Post-Installation Procedures.* (1) Inspect the coverage and depth of the insulation. Fill all "pockets" and voids in the insulation. Level insulation in a manner which will not damage wiring or any other items.

(2) Turn off electric power and clear all electric wall outlet boxes and switch boxes of any insulation material.

(3) Remove all *temporary* blockings which were installed over vent openings in attics.

### § 456.906 Standard practice for the installation of mineral fiber batts and blankets thermal insulation.

(a) *Scope.* (1) This practice covers the installation of mineral (rock, slag, or glass) fiber batt and blanket thermal insulation in ceilings, attics, floors, walls, and on basement and crawl space walls and ducts of existing residential buildings.

(2) A working knowledge of the terminology and fundamentals of construction, and applicable codes is necessary for the proper application of this standard.

(b) *Safety Precautions.* Do not smoke in the attic.

(c) *Pre-installation Procedures.* (1) *General.* (i) Identify all recessed lighting fixtures (including wiring compartments and ballasts) furnaces, vents, chimneys, and other heat-producing devices in all areas where insulation is to be installed.

(ii) Inspect the roof, walls, ceilings, and attic floors to identify areas where a previous moisture problem has caused paint peeling, warpage, stain, visible fungus growth, rotting, or other structural damage. Do not install insulation in such areas until the resident has been notified and these conditions have been corrected and their source(s) eliminated. If the resident, after being informed of the moisture condition and the effects of installing insulation in such areas, elects to proceed with the installation, the resident must so state in writing on the contract.

(2) *Attics and Ceilings.* (i) Identify and measure ventilation area in attics. Do not install insulation in attics unless ventilation openings in attic areas conform to one of the following requirements:

(A) 1 $ft^2$ (0.1 $m^2$) minimum of free ventilation area per 150 $ft^2$ (15 $m^2$) of attic floor area, if no vapor barrier exists in the attic;

(B) 1 $ft^2$ (0.1 $m^2$) minimum of free ventilation area per 300 $ft^2$ (30 $m^2$) of attic floor area if a vapor barrier does exist;

(C) 1 $ft^2$ (0.1 $m^2$) minimum of free ventilation area per 300 $ft^2$ (30 $m^2$) of attic floor space if at least 50 percent of the required ventilating area is provided with fixed ventilation located in the upper portion of the space to be ventilated (at least three feet ($90^2$ mm) above eave or soffit vents) with the remainder of the required ventilation provided by eave or soffit vents, if no vapor barrier exists. If the free ventilation area of louvers is not known, assume that it is half of the area of the ventilation opening and increase the opening accordingly.

(ii) Ensure that all ventilation openings have suitable louvers or screens to prevent rain or snow from entering the attic.

(iii) For buildings located in Zone I of Figure 1 if there is no existing insulation or if existing insulation is to be removed, provide a vapor barrier membrane on the upper surface of the ceiling material. Never install a vapor barrier on top of existing insulation.

**Note 1.**—For buildings in Zones I and II of Figure 1, where there is existing ceiling insulation and no vapor barrier, it is recommended that a vapor barrier such as paints and wall coverings which are labeled by the manufacturer as having a perm rating of one (1) or less and are applied in strict accordance to the manufacturer's instructions be installed on the interior surface of bathrooms and unvented kitchen and laundry areas. It is also recommended that all cracks and penetrations on the interior ceiling surface of these rooms (such as around lighting fixtures and at wall/ceiling joints) be caulked.

**Note 2.**—The above requirements for moisture control are minimum requirements needed to prevent long term moisture damage. Homes which are characterized by one or more of the following conditions are more likely to experience excessive moisture accumulation which can be corrected by application of a vapor barrier and caulking as described above or by additional ventilation of the occupied space:

a. Homes with an area of less than 800 square feet (75 $m^2$);

b. Homes with less than 250 square feet (23 $m^2$) per occupant;

c. Homes with tight wall and ceiling construction and weatherstripped windows and doors;

d. Electrically heated homes or homes with a heating system which uses outside combustion air.

A relative humidity indicator may be installed to monitor the humidity level and determine when excessive moisture accumulation is likely to occur.

(3) *Floors and Basement and Crawl Space Walls.* (i) Where insulation is to be installed beneath floors over crawl spaces or on crawl space walls, cover the ground surface with a ground cover which acts as a vapor barrier (such as 6-mil (0.15 mm) polyethylene sheeting lapped at the joints). Turn the ground cover up at least six inches (150 mm) at the walls.

(ii) Where practical in crawl spaces provide a free ventilation area of one square foot (0.1 $m^2$) for every 1500 square feet (150 $m^2$) of the ground area of the crawl space. Provide cross ventilation where possible. (See paragraph (c)(2)(i)(C) for guidance on estimating free ventilation area.)

(iii) Where insulation is to be installed on crawl space walls, provide a means to seal off the ventilation area(s) during the heating season.

Note 3.—Insulation of floors over unheated spaces will cause these spaces to be colder. Accordingly, appropriate measures may need to be taken to keep water pipes from freezing during colder weather.

(iv) Provide a vapor barrier on the winter warm side of floor insulation in buildings located in Zones I and II of Figure 1.

(4) Ducts. (i) Inspect duct to assure that it is dry and clean and that all joints are securely connected. Seal all joints that do not appear airtight with duct tape or other appropriate materials.

Note 4.—Insulation of ducts located in unheated spaces will cause these spaces to be colder. Accordingly, appropriate measures may need to be taken to keep pipes from freezing during colder weather.

(d) *Installation Procedures.* (1) *General.* (i) Do not install insulation unless the pre-installation procedures have been carried out and any defects which were identified were corrected, and their causes eliminated.

(ii) Handle all insulation material in accordance with manufacturer's instructions and keep it dry and free of extraneous materials.

(iii) Install insulation so that it will not be in contact with the ground or other sources of water.

(iv) Install insulation only between conditioned and unconditioned spaces.

(v) Install insulation so that it fits tightly between framing members on all sides. Cut insulation that is too long for a space to the correct size. If insulation is too short for a space, cut a piece to fill the void and tightly butt-joint batts. Do not double over or unnecessarily compress insulation.

(vi) Permanently maintain the clearances, specified in paragraphs (vii) and (viii) below around all heat producing devices.

(vii) Provide a three-inch (75 mm) minimum clearance around all recessed lighting fixtures (including wiring compartments and ballasts) and other heat producing devices not covered in paragraph (viii). Do not cover these devices so as to entrap heat or prevent the free circulation of air unless they are approved for the purpose.

(viii) Provide the minimum clearances around gas fired appliances specified in NFPA–54, the National Fuel Gas Code. Around oil-fired appliances, provide the minimum clearances specified in NFPA–31, Standard for the Installation of Oil Burning Equipment. Around masonry chimneys or masonry enclosing a flue provide a minimum two-inch (50 mm) clearance from the outside face of the masonry. Around vents, chimney and vent connectors and chimneys other than masonry chimneys, provide the minimum clearances specified in NFPA–211, Standard for Chimneys, Fireplaces, and Vents.

(ix) When installing mineral fiber blanket insulation having no membrane (or having a non-flammable membrane) which, in addition to meeting all the requirements specified in § 456.805, is also non-combustible as defined in ASTM designation E 136–79, the airspaces specified in this section need not be provided around vents and chimneys.

(x) Assure that all devices which may require periodic servicing remain accessible after the insulation is installed.

(2) *Walls.* (i) Zones I and II of Figure 1, install a vapor barrier on the winter warm side of insulation installed in exterior walls. Secure the vapor barrier to the studs so as to avoid gaps and fishmouths. If the insulation does not have a vapor barrier attached to it provide a separate vapor barrier on the winter warm side over the installed insulation.

(ii) With duct tape (or equivalent), tape all tears and penetration in the vapor barrier and all joints which are not overlapped by at least three inches.

(iii) If the insulation material is provided with a flammable vapor barrier, or if a separate vapor barrier which is flammable is installed, cover the insulation with a finish material having a finish rating of not less than 15 minutes when tested according to ASTM Designation E 119–76.

(3) *Attics, Ceilings, and Floors.* (i) Always place vapor barriers on the winter warm side of the insulation. Never install a combustible vapor barrier so that it remains exposed.

(ii) When installing insulation around bridging or cross bracing of ceiling or floor joists fit the insulation material tightly around these obstructions and assure that there are no gaps in the insulation.

(iii) When recessing insulation batts in floor joist cavities turn insulation up at the header or cut and attach pieces of insulation to the header to avoid heat loss through the header.

(iv) Fit insulation tightly in floor joist areas and secure in place with either wire fasteners, galvanized wire, or nylon mesh or galvanized screen held in place by stapling or nailing, or galvanized wire lacing held in place by stapling or nailing.

(v) Do not cover soffit vents with insulation nor in any other way restrict attic ventilation.

(vi) Install insulation around vents which open into the attic in a manner that will ensure free movement of air through the vent into the attic.

(vii) Fit the attic side of trap doors or panels with insulation batt except where prevented by a retractable ladder.

(4) *Basement and Crawl Space Walls.* (i) Where the joists run parallel to the wall, install the wall insulation by stapling the top of each batt to the band joist. Where the joists run at right angles to the wall, install short pieces of insulation against the header, ensuring that there are no gaps in the insulation. Then, install the wall insulation by stapling the top of each batt to the sill.

(ii) Ensure that the batts fit snugly against each other and that they are sufficiently long to cover the wall and two feet of the crawl space floor.

(5) *Ducts.* (i) Install duct insulation only on ducts located in unconditioned spaces.

(ii) Install insulation batt or blanket with the vapor barrier on the outside.

(iii) Butt joints of batts tightly and in such a way that a vapor barrier tab overlaps the joints by at least two inches. Mechanically fasten the tab to the underlying vapor barrier and seal the joints with duct tape, or alternatively, overlay insulation and tape when vapor barriers are attached.

(iv) On rectangular ducts install insulation so that at the corners it is not compressed more than 50 percent of its nominal thickness.

(v) On horizontal ducts over 24 inches (600 mm) wide, secure the bottom of the insulation with mechanical fasteners as required by the manufacturer. Seal fastener penetrations to provide an airtight system.

(vi) Install any protective covers required by local codes and regulations.

(e) *Post-installation Procedures.* (1) Ensure that insulation does not restrict attic soffit vents.

(2) Ensure that all required clearances have been maintained.

(3) Ensure that, where required, all insulation is covered with a suitable covering material.

**§ 456.907 Standard practice for the installation of organic cellular rigid board thermal insulation.**

(a) *Scope.* (1) This practice covers the installation of organic cellular rigid board thermal insulation on concrete floors, foundation perimeters, interior of masonry walls, interior of frame walls, ceilings, and as exterior sheathing on walls and roofs of existing residential buildings.

(2) This practice covers the installation of the rigid board but does not include in detail the installation of exterior siding and roofing, required to protect rigid board insulation from the effects of weather, or the installation of interior fire protective coverings.

(3) A working knowledge of the terminology and fundamentals of construction, and applicable codes is necessary for the proper application of this standard.

(b) *Safety Precautions.* (1) Do not smoke in any area in which insulation is being installed or cut.

(2) The vapors of many solvents used in mastics and adhesives in the installation of organic cellular rigid board thermal insulation are flammable. Keep solvents in approved containers and follow the specific label instructions.

(c) *General Requirements.* (1) For all rigid board applications, carry out the pre-installation, installation, and post-installation procedures in the order prescribed in paragraphs (d) through (m) of this section.

(2) For interior applications of rigid board insulation on walls and ceilings install, on all exposed faces and edges of the insulation material, a cover having a finish rating of not less than 15 minutes, when tested according to ASTM Designation E 119–76.

(3) Install insulation only between conditioned and unconditioned spaces for energy conservation, except as provided in paragraphs (d) and (g) of this section.

(4) Follow the requirements applicable to the control of moisture in buildings to be insulated as detailed in Table 1.

(5) Install all vapor barriers required by this practice on the interior of the innermost insulation.

(6) Follow all insulation manufacturer's recommendations relative to the venting of wall constructions.

(7) Ensure that only mastics and solvents compatible with the board insulation material are used.

(d) *Foundation Perimeter.* (1) *Applicability.* This section applies to the installation of organic cellular rigid board thermal insulation to the exterior of foundation walls and around the perimeter of concrete slab-on-grade floors. Only Type 3 polystyrene boards may be used for this application.

(2) *Pre-Installation Procedures.* (i) Identify any termite shields that would be covered by the insulation. Do not install board insulation unless the termite shield is effectively extended beyond the insulation and cover to be installed.

(ii) Prepare a trench of not less than 12 inches (300 mm) in depth on the exterior of the foundation.

(iii) Install any anchoring devices required for the application of the covering material.

(iv) Identify surface projections, such as electrical outlets, utility meters, piping, and faucets, which will require special attention.

(3) *Installation Procedure.* (i) Do not install insulation board with adhesives when the wall surface is wet or the temperature is below freezing.

TABLE 1. MOISTURE CONTROL REQUIREMENTS APPLICABLE TO THE INSTALLATION OF RIGID BOARD THERMAL INSULATION

| Material | Where Installed | Cavity | Requirements |
|---|---|---|---|
| Board with vapor barrier facings (Also boards which are rated by the manufacturer to have a permeability of less than 1 in the thickness in which the board will be installed) | Interior | filled or empty | No additional winter-warm side vapor barrier |
| | Exterior | filled | In zones I and II of Figure 1, vapor barrier on the winter-warm side and sealing of interior cracks |
| | Exterior | empty | No additional winter-warm side vapor barrier |
| Board without vapor barrier facings | Interior | filled or empty | In Zones I and II of Figure 1, vapor barrier on the winter-warm side and sealing of interior cracks |
| | Exterior | filled | In Zones I and II of Figure 1, vapor barrier and sealing of interior cracks only in bathrooms and other high moisture areas |
| | Exterior | empty | No additional winter-warm side vapor barrier required |

(ii) Cut board insulation to fit around any surface projections, around windows, and at corners so as to fit tightly against each other and against the anchoring devices.

(iii) Attach the insulation board against the wall or slab edge.

(iv) To provide impact resistance to those parts of the boards which will remain exposed after backfilling, install a protective cover.

(v) Back-fill and tamp ground around foundation or slab edge to slope away from the building.

(4) *Post-Installation Procedures.* Ensure that any termite shields are effectively extended beyond the insulation and its cover.

(e) *Concrete Floors.* (1) *Applicability.* This section applies to the installation of organic cellular rigid board thermal insulation on concrete floors over unheated basements and crawl spaces or on concrete slabs on grade.

(2) *Pre-Installation Procedures.* (i) Ensure that the concrete floor surface is clean, dry, and free of oil and loose paint.

(ii) Fill any cracks in concrete floors with patching cement several days prior to installation.

(iii) Seal joints between the floor and walls to reduce air infiltration.

(iv) Identify all floor drains. Do not cover such drains unless permitted by local codes.

(v) Prior to installing insulation on a slab on grade, provide a waterproof barrier such as two separate brushed-on coatings of asphalt emulsion.

(3) *Installation Procedure.* (i) Cut the insulation board to appropriate size so as to provide tight but not forcefit joints.

(ii) Adhere the board thermal insulation to the concrete, assuring an intimate and continuous bond.

(iii) Mechanically fasten to the concrete floor slab an underfloor of sufficient strength to distribute any imposed load so as not to crush the insulation.

(iv) Protect the floor area around any permanently installed heat producing equipment in accordance with the requirements of NFPA 31, Standard for the Installation of Oil Burning Equipment, for oil burning equipment or NFPA 54, the National Fuel Gas Code, for gas-fired equipment. Consult the foam manufacturer for additional requirements regarding the protection of foam from excessive heat.

(4) *Post-Installation Procedures.* (i) Ensure that the overlayment subfloor is flat, all subfloor panels butt or tongue and groove joints are tight, and the subfloor is securely fastened.

(ii) Ensure that, where required, protective coverings around heat producing equipment have been provided.

(f) *Masonry Wall Interior.* (1) *Applicability.* This section applies to the installation of organic cellular rigid board insulation to the interior of masonry walls, particularly basement walls, which separate conditioned and unconditioned spaces.

(2) *Pre-Installation Procedures.* (i) Ensure that the walls are structurally sound; that they are dry and do not show signs of recent dampness (such as mold); and are clean, free of grease, loose paint, and loose material.

(ii) Remove any baseboards or moldings on walls to be insulated.

(iii) Install any anchoring devices required for the application of the covering material.

(iv) Determine edge treatment to be provided at windows and doors after the insulation and covering are installed.

(v) Identify all electrical outlets and switches. Have an approved electrician extend these to the level of the new surface, if required.

(vi) Identify and seal cracks at ceiling/wall and floor/wall joints and window and door frames to reduce air infiltration.

(3) *Installation Procedures.* (i) Provide the minimum clearances around gas fired appliances specified in NFPA–54, the National Fuel Gas Code. Around oil-fired appliances, provide the minimum clearances specified in NFPA–31, Standard for the Installation of Oil Burning Equipment. Around masonry chimneys or masonry enclosing a flue provide a minimum two-inch (50 mm) clearance from the outside face of the masonry. Around vents, chimney and vent connectors and chimneys other than masonry chimneys, provide the minimum clearances specified in NFPA–211, Standard for Chimneys, Fireplaces, and Vents. Consult the foam manufacturer for additional requirements regarding the protection of foam from excessive heat.

(ii) Cut the board insulation to fit around any surface projections such as windows, electrical outlets, conduits, and surface mounted water and drain pipes.

(iii) Attach the insulation board to the wall.

(iv) Do not cover water or drain pipes with insulation board (during cold weather, heat from the house may be necessary to prevent the pipes from freezing). If possible, wedge some insulating board pieces between the pipes and the wall.

(v) After all insulation board is applied, install a cover having a finish rating of not less than 15 minutes when tested according to ASTM Designation E 119–76. Water and drain pipes may be covered with approved covering material.

(vi) Cover the edges of the insulation around electrical outlets and switches, leaving sufficent space to permit their convenient use.

(vii) Replace moldings at floor and install trim as needed around doors and windows.

(4) *Post-Installation Procedures.* (i) Ensure that electrical outlets and switches operate freely.

(ii) Ensure that the required clearances around heat producing equipment have been maintained.

(g) *Masonry Crawl Space Walls.* (1) *Applicability.* This section applies to the installation of organic cellular rigid board insulation to the interior of crawl space walls as an alternate to insulating the floor over a crawl space.

(2) *Pre-Installation, Installation and Post-Installation Procedures.* (i) Ensure that all applicable provisions of paragraph (f) of this section are carried out.

(ii) Do not cover ventilation openings but provide a means for closing the openings during the heating season.

(iii) Cover the ground surface with a ground cover which acts as a vapor barrier (such as 6-mil (0.15 mm) polyethylene sheeting lapped at the joints). Turn the ground cover up at least six inches (150 mm) at the walls.

(h) *Frame Wall Interior.* (1) *Applicability.* This section applies to the installation of organic cellular rigid board insulation to the interior of finished framed wall constructions which separate conditioned from unconditioned spaces.

(2) *Pre-Installation Procedures.* (i) Ensure that all provisions of paragraph (g)(2) of this section are carried out.

(ii) Secure any anchoring devices required for the application of the covering material to the wall framing studs.

(iii) Identify water and drain pipes both on the surface of the wall and in the wall cavities. Provide nailers as needed for attaching the covering material.

(3) *Installation Procedures.* (i) Install the insulation boards in accordance with the requirements of paragraph (f)(3) of this section.

(ii) Do not install insulation over stud spaces that contain water supply or waste pipes (during cold weather, heat from the house may be necessary to prevent the pipes from freezing). The covering material may be placed over such stud spaces containing pipes.

(4) *Post-Installation Procedures.* (i) Conduct post-installation procedures in

accordance with paragraph (f)(4) of this section.

(i) *Ceilings.* (1) *Applicability.* This section applies to the installation of organic cellular rigid board insulation to the underside (winter warm side) of existing plaster or gypsum board ceilings. See paragraph (j) of this section for requirements for the interior installation of insulation board to wood roof decks.

(2) *Pre-Installation Procedures.* (i) Ensure that the ceilings are structurally sound, that they are dry and do not show signs of recent dampness such as mold, are clean, free of grease, loose paint, and loose material.

(ii) Remove any existing moldings at the wall to ceiling joints or on the ceiling itself.

(iii) Identify electrical outlets and recessed lighting fixtures. Have an approved electrician lower these to the level of the new finished ceiling surface, if required.

(iv) Identify the location of ceiling joists.

(v) Seal all cracks at wall to ceiling joints, and any other cracks such as at electrical outlets.

(3) *Installation Procedure.* (i) Maintain a three inch (75 mm) minimum clearance around all recessed lighting fixtures (including wiring compartments and ballasts) and other heat producing devices not covered in paragraph (ii). Do not cover these devices so as to entrap heat or prevent free circulation of air unless they are approved for the purpose.

(ii) Provide the minimum clearances around gas fired appliances specified in NFPA–54, the National Fuel Gas Code. Around oil-fired appliances, provide the minimum clearances specified in NFPA–31, Standard for the Installation of Oil Burning Equipment. Around masonry chimneys or masonry enclosing a flue provide a minimum two-inch (50 mm) clearance from the outside face of the masonry. Around vents, chimney and vent connectors and chimneys other than masonry chimneys, provide the minimum clearances specified in NFPA–211, Standard for Chimneys, Fireplaces, and Vents. Consult the foam manufacturer for additional requirements regarding the protection of foam from excessive heat.

(iii) Cut the insulation board to appropriate size and attach the board to the ceiling.

(iv) Install a cover having a finish rating of not less than 15 minutes when tested according to ASTM Designation E 119–73.

(v) If the cover consists of gypsum or similar board material, install the board so that the joints fall on the center line of the ceiling joists and nail the board to the joists with nails of sufficient length to penetrate the cover material, the insulation board, the existing ceiling, and into the ceiling joist.

(vi) Finish the ceiling with tape and spackle as required.

(4) *Post-Installation Procedures.* (i) Ensure that all surfaces and edges of insulation board are covered with a material having a finish rating of at least 15 minutes when tested according to ASTM Designation E 119–76.

(ii) Ensure that the required clearances around heat producing equipment have been maintained.

(j) *Exposed Wood Deck Ceilings.* (1) *Applicability.* This section applies to the installation of organic cellular rigid board insulation to the underside (winter warm side) of exposed wood roof decks.

(2) *Pre-Installation Procedures.* Apply all provisions of paragraph (i)(2) of this section.

(3) *Installation Procedure.* (i) Cut the insulation board to fit snugly between any exposed joists or rafters.

(ii) Maintain the minimum clearances around heat producing devices specified in paragraphs (i)(3)(i) and (ii) of this section.

(iii) Install the insulation board securely to the wood deck. If mechanical fasteners are used, do not puncture the roofing.

(iv) Install a cover having a finish rating of not less than 15 minutes when tested in accordance with ASTM Designation E 119–76.

(v) Secure the cover through the insulation board to the wood deck. Do not puncture the roofing.

(vi) Finish the ceiling with tape and spackle as required and install edge trim as needed.

(4) *Post-Installation Procedures.* (i) Ensure that all surfaces and edges of insulation board are covered with a material having a finish rating of at least 15 minutes when tested according to ASTM Designation E 119–76.

(ii) Ensure that the required clearances around heat producing equipment have been maintained.

(k) *Frame Wall Exterior.* (1) *Applicability.* This section applies to the installation of organic cellular rigid board insulation to the exterior of frame walls.

(2) *Pre-Installation Procedures.* (i) Assure that the walls are free of fungus growth (dry rot) and that they can support the load of the insulation and the weather resistant exterior finish. If the existing exterior wall cover is sound and free of rot, insulation can be installed over the existing siding. If the existing surface is attacked by fungus growth, remove the old siding. If the old siding is removed, assure that the structural integrity of the wall is maintained, either by the remaining cross bracing or the installation of new siding.

(ii) Remove any trim around windows, doors, corners, and at the sills as required to install the insulation.

(iii) Identify any termite shields that would be covered by the insulation. Do not install board insulation unless termite shields are effectively extended beyond the insulation and cover to be installed.

(iv) Determine edge treatment to be given at corners, sills, windows, and doors.

(v) Identify surface projections, such as electrical outlets, utility meters, and faucets, which will require special attention.

(3) *Installation Procedure.* (i) If the existing wood siding is sound and left in place, install the insulation board with mechanical fasteners to the wood siding in accordance with the manufacturer's instructions.

(ii) If the existing siding was removed, or if the siding consists of light gage metal over an "insulation board" sheathing, install the organic cellular rigid insulation board with mechanical fasteners to the wall studs or to an existing wood sheathing in accordance with the manufacturer's instructions.

(iii) Maintain the clearances around chimneys and vents specified in NFPA 211, Standard for Chimneys, Fireplaces, and Vents. Consult the foam manufacturer for additional requirements regarding the protection of foam from excessive heat.

(iv) Cover the insulation board with a suitable weather resisting exterior finish, such as aluminum or vinyl siding, wood or asbestos shingles, or metal lath and stucco.

(v) Attach the cover through the insulation board and existing wood siding or sheathing to the wood frame studs; or attach furring strips or a plywood nailer through the insulation board to the stud wall and attach the finish to the strips or nailer.

(vi) Install flashing and trim at windows, doors, corners, and sills so as to preclude the penetration of water into the wall cavity.

(vii) Flash and seal around any obstructions such as at water faucets and electrical outlets.

(viii) Provide weep holes at the sill plate as required.

(ix) Where insulation board is installed on walls which have cavity insulation, provide for moisture control in accordance with the requirements of Table 1.

(4) *Post-Installation Procedures.* (i) Ensure that the required clearances around chimneys and vents have been maintained.

(ii) Ensure that all surfaces of insulation board are covered with a suitable weather resisting finish material.

(iii) Ensure that joints in trim, flashing, and protective cover at windows, doors, corners, faucets, and electrical outlets are tight and sealed as required.

(iv) Ensure that weep holes in the cover are provided as required and are free of clogging material.

(l) *Masonry Wall Exterior.* (1) *Applicability.* This section applies to the installation of organic cellular rigid board insulation to the exterior of masonry or masonry veneer walls.

(2) *Pre-installation Procedures.* (i) Ensure that the walls are free of grease, loose paint and loose material, and major cracks.

(ii) Remove any trim around windows, doors, corners, and at the sill as required to install the insulation.

(iii) Identify any termite shields that would be covered by the insulation. Do not install board insulation unless the termite shield is effectively extended beyond the insulation and cover to be installed.

(iv) Determine edge treatment to be given at corners, sills, windows, and doors.

(v) Identify surface projections such as electrical outlets, utility meters, and faucets which will require special attention.

(3) *Installation Procedure.* (i) Attach the insulation board to the wall as recommended by the manufacturer.

(ii) Maintain the clearances around chimneys and vents specified in NFPA 211, Standard for Chimneys, Fireplaces, and Vents. Consult the foam manufacturer for additional requirements regarding the protection of foam from excessive heat.

(iii) Cover the insulation board with a suitable weather resistant exterior finish, such as aluminum or vinyl siding, wood or asbestos shingles, or metal lath and stucco.

(iv) Fasten the cover through the insulation board onto the masonry wall; or secure furring strips or a plywood nailer base through the insulation board onto the masonry wall and attach the finish to the strips or nailer base.

(v) Install flashing and trim at windows, doors, corners, and sills so as to preclude the penetration of water.

(vi) Flash and seal around any obstructions such as at water faucets and electrical outlets.

(vii) Provide weep holes at the sill plate as required.

(4) *Post-Installation Procedures.* (i) Ensure that the required clearances around chimneys and vents have been maintained.

(ii) Ensure that the insulation board has been properly covered.

(iii) Ensure that all required flashing and sealing has been provided.

(iv) Check that all necessary weep holes at the sill plate have been provided and are unobstructed.

(m) *Roof Exterior.* (1) *Applicability.* This section applies to the installation of organic cellular rigid board insulation to the exterior of sloped roofs. This section does not apply to roofs over unheated attics.

(2) *Pre-Installation Procedures.* (i) Inspect the roof to assure that it is not sagging nor showing evidence of rot in shingles, sheathing, or structural members. Do not install insulation on roofs that are not able to support the additional load of the insulation and new roofing system or over roofs that show signs of rot.

(ii) If there are two or more layers of roofing, remove all roofing. Insulation may be applied over a single layer of roofing.

(iii) Install nailers the thickness of the insulation board along all edges and along the ridge.

(3) *Installation Procedure.* (i) Install insulation board as recommended by the manufacturer. Use an application method which fastens the insulation to the roof sheathing. Do not use adhesive to fasten the insulation to shingles or roofing felt only.

(ii) Maintain the clearances around chimneys and vents specified in NFPA 211, Standard for Chimneys, Fireplaces, and Vents. Consult the foam manufacturer for additional requirements regarding the protection of foam from excessive heat.

(iii) Install a plywood overlay, mechanically fastened to the original sheathing, on top of the insulation board and cover the plywood with roofing.

(iv) Install all flashing, gutters, and trim as required.

(4) *Post-Installation Procedures.* (i) Ensure that the required clearances around chimneys and vents have been maintained.

(ii) Ensure that the new roofing entirely covers the insulation.

(iii) Ensure that all flashing is properly installed, particularly at dormers, chimneys, or where the roof adjoins vertical wall sections.

**§ 456.908 Standard practice for the installation of reflective insulation.**

(a) *Scope.* (1) This practice covers the installation of reflective (aluminum foil) insulation in ceilings, attics, floors, and wall cavities of existing residential buildings.

(2) A working knowledge of the terminology and fundamentals of construction, and applicable codes is necessary for the proper application of this standard.

(b) *Pre-Installation Procedures.* (1) *General.* (i) Identify and examine all visible wiring, junction boxes, and other metallic or electrical equipment in the areas where insulation is to be installed. Do not install relective insulation if the wiring is found to have frayed, cracked, deteriorated or missing electrical insulation.

(ii) Ensure that all electrical equipment in the building is grounded. Do not install reflective (aluminum foil) insulation in building in which electrical equipment is not grounded.

(iii) Identify air supply and return ducts, pipes, electrical wires and other obstructions located in spaces between joists and studs. Ground all metallic heating and air conditioning ducts which may come in contact with the installed insulation. Do not install reflective insulation where metallic heating and air conditioning ducts are not grounded.

Note 1.—Repairs or replacement of electrical wiring to eliminate defects as well as all other electric-related activities are to be carried out only by personnel approved for such work.

Note 2.—Insulation of floors over unheated spaces will cause these spaces to be colder. Accordingly, approximate measures may need to be taken to keep water pipes from freezing during colder weather.

(2) *Attics and Ceilings.* (i) Identify and measure ventilation area in attics. Do not install insulation in attics unless 1 $ft^2$ (0.1 $m^2$) minimum of free ventilation area per 300 $ft^2$ (30 $m^2$) of attic floor area is provided. If the free ventilation area of louvers is not known, assume that it is half of the area of the ventilation opening and increase the opening accordingly.

(ii) Ensure that all ventilation openings have suitable louvers or screens to prevent rain or snow from entering the attic.

(iii) Identify all recessed lighting fixtures (including wiring compartments and ballasts) and other heat producing devices.

(3) *Floors.* (i) Where insulation is to be installed beneath floors over crawl spaces, cover the ground surface with a ground cover which acts as a vapor barrier (such as 6-mil (0.15 mm) polyethylene sheeting lapped at the joints). Turn the ground cover up at least six inches (150 mm) at the walls.

(ii) Where practical in crawl spaces, provide a free ventilation area of one square foot (0.1 $m^2$) for every 1500

square feet (150 $m^2$) of the ground area of the crawl space. Provide cross-ventilation where possible. (See paragraph (2)(i) for guidance on estimating free ventilation area).

(c) *Installation Procedures.* (1) *General.* (i) Do not install reflective insulation unless the pre-installation procedures have been carried out and any defects which were identified were corrected and their causes eliminated.

(ii) Install insulation only between conditioned and unconditioned spaces.

(iii) Do not cover recessed lighting fixtures (including wiring compartments and ballasts) and other heat producing devices so as to entrap heat or prevent free circulation of air unless they are approved for the purpose.

(iv) Handle the insulation materials in accordance with the manufacturer's instructions.

(v) Ensure that the reflective surfaces are free of dirt, oil film, and other surface coatings which can reduce the effective reflectance of the surfaces.

(vi) Install reflective insulation flush or recessed with the framing members as shown in Figures 2 and 3.

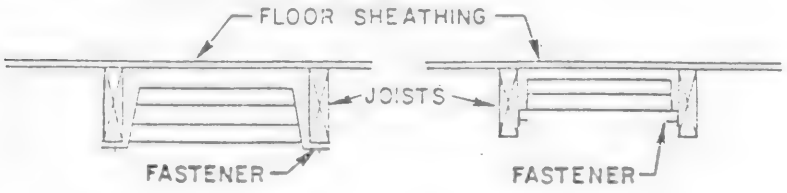


Figure 2. Flush Application Figure 3. Recessed Application

(vii) Secure the insulation in place with aluminum, coated copper-clad steel, plastic, or coated galvanized steel staples.

(viii) Ensure that the insulation is cut to the correct size, fits tightly between joists and studs on all sides and that there are no wrinkles or fishmouths. Where wrinkles and fishmouths cannot be avoided, tape the joint between the insulation and framing members, or between adjacent sections of insulation (in flush installations).

(ix) Ensure that where the material is installed to form multiple reflective air spaces, the spaces measure, at a minimum, ¾ of an inch (19 mm). Maintain the distance between reflective surfaces as uniformly as possible. Reflective surfaces must not touch each other or the thermal performance of the insulation will be reduced.

(x) Tape and seal all splices and tears in the insulation. Seal all punctures in the insulation by taping reflective material to the damaged area.

(xi) Avoid joints within the length between joist supports or stud spaces. Seal joints which are required with tape.

(xii) Tightly seal the ends of reflective insulation against the surfaces which they contact.

(xiii) Closely fit insulation around plumbing and other obstructions and tape securely to eliminate gaps through which air may pass into the reflective air spaces.

(2) *Walls.* (i) Do not install insulation in contact with the ground or other sources of water.

(ii) Cut the insulation around wall switches and outlet boxes and tape the openings.

(3) *Attics, Ceilings, Floors.* (i) When installing insulation around bridging or cross bracing of ceilings or floor joists, ensure that the insulation material is fitted tightly around these obstructions and that there are no gaps in the insulation.

(ii) Do not cover soffit vents with insulation nor in any other way restrict attic ventilation.

(iii) Install insulation around vents which open into the attic in a manner that will ensure the free movement of air through the vent into the attic.

(iv) Fit the attic side of access doors or panels with a suitable insulation material except where prevented by a retractable ladder.

(d) *Post-Installation Procedures.* (1) Ensure that the reflective insulation provides a continuous and unbroken surface between framing members, that no gaps, tears, and other openings exist, and that all joints are tightly taped.

(2) Ensure that insulation installed in attics does not restrict soffit or other vents which open into the attic.

(3) Ensure that the required clearances around heat-producing devices have been provided.

**§ 456.909 Standard practice for the installation of urea-formaldehyde foamed-in-place insulation. [Reserved]**

**§ 456.910 Certification procedures for the installation of thermal insulation materials.**

(a) Upon completion of each installation of thermal insulation materials performed under the circumstances described in the State Plan pursuant to § 456.305, the person responsible for carrying out such installation shall complete, in triplicate, a "Certification of Insulation" form such as exhibited in Figure 1.

(b) *Content.* The "Certification of Insulation" shall contain the following information:

(1) Address of the building;

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Form 1. CERTIFICATION OF INSULATION

BILLING CODE 6450-01-C

PART I - GENERAL

ADDRESS OF RESIDENCE:

_____

_____

DATE OF INSTALLATION COMPLETION: _____

NAME AND ADDRESS OF CONTRACTOR:

_____

_____

_____

PART II - AREAS INSULATED

WALLS (_____sq. ft.)

TYPE OF INSULATION:

_____

MANUFACTURER:

_____

| R VALUE INSTALLED | AMOUNT INSTALLED |
|---|---|
| | |

CEILINGS (_____sq. ft.)

TYPE OF INSULATION:

_____

MANUFACTURER:

_____

| R VALUE INSTALLED | AMOUNT INSTALLED |
|---|---|
| | |

FLOORS (_____sq. ft.)

TYPE OF INSULATION:

_____

MANUFACTURER:

_____

| R VALUE INSTALLED | AMOUNT INSTALLED |
|---|---|
| | |

PART III - CERTIFICATION

I, _____ certify that the residence identified in PART I was insulated
(PRINT NAME)
as specified in PART II and the installation was conducted in conformance to applicable codes, standards, and regulations.

_____
Authorized Signature

(2) Date of completion of installation;
(3) Name and address of the contractor;
(4) Insulation type;
(5) Insulation manufacturer;
(6) Location and dimension (in square feet) of each space which was insulated;
(7) The amount of insulation which was installed in each of the locations identified in subparagraph (6) of this paragraph, given in the units in which the material is most commonly available (i.e., the number of batts, bags, etc., of a specified size or the number of square feet, etc.);
(8) The R value installed in each of the locations identified in paragraph (b)(6) of this section;
(9) A statement, signed by an authorized individual, certifying that the installation was carried out in conformance to the applicable standard practices, codes, and regulations.
(c) Distribution and Posting Requirements. The "Certification of Installation" shall be distributed and posted as follows:
(1) One copy shall be permanently affixed to the structure in an accessible but inconspicuous location;
(2) One copy shall be submitted to the homeowner or building occupant; and
(3) One copy shall be retained for a period of five years by the agency responsible for the installation.

**§ 456.911 Standard practice for the installation of storm windows, thermal windows, multi-glazing units and storm doors and thermal doors.**

(a) *Scope.* (1) This practice covers the installation of storm windows, thermal windows, multi-glazing units and storm and thermal doors in existing residential buildings.
(2) This practice applies to wood, metal, and plastic framed storm windows or thermal windows, sealed multi-glazing units, storm doors and thermal doors. This practice also applies to multi-glazing systems which include heat absorbing or heat reflecting glazing.
(b) *Safety Precautions.* (1) Do not install window or door devices which would restrict means of egress which are required by applicable codes and regulations.
(2) In doors, sidelights and panels, install only safety glazing in accordance with CPSC requirements given in 16 CFR, Part 1201.
(c) *Storm Windows.* (See Figure 4).
(1) *Pre-Installation Procedures.*
(i) Examine the framing of the prime window to ensure that it is sound, free of decay, and will provide secure anchorage for the storm window frames.

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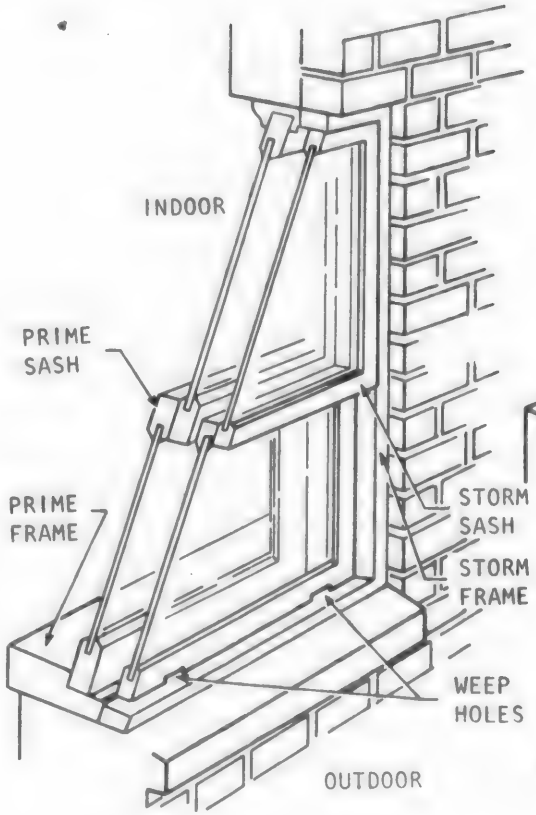


Figure 1. Storm Windows

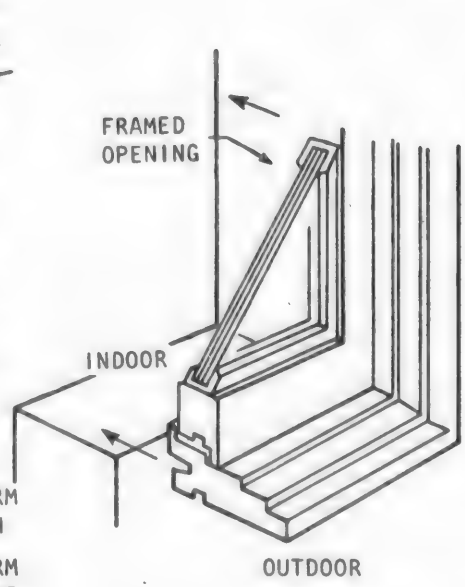


Figure 2. Thermal Windows

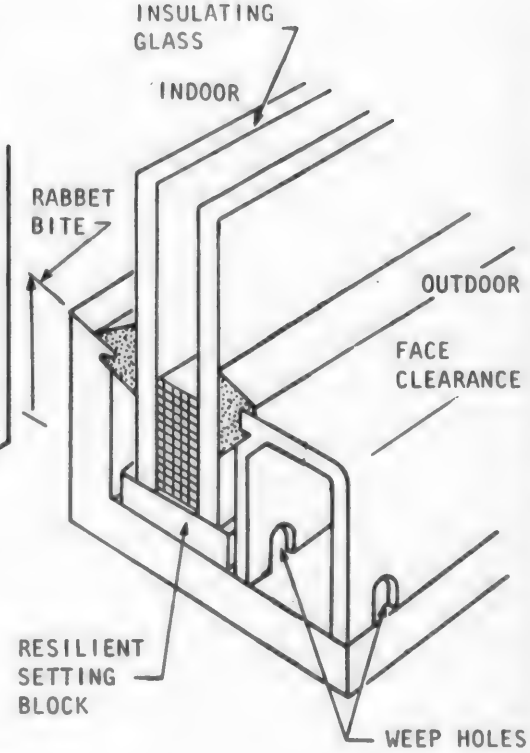


Figure 3. Multi Glazing

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(ii) Examine and repair weatherstripping and sealant of the prime window.

Note 1.—Where the prime window is not weatherstripped, it is recommended to install weatherstripping.

(iii) Ensure that the frame contact areas are free of protrusions that would interfere with proper installation of the storm windows.

(iv) Measure and plumb the prime window or its opening in accordance with the manufacturer's instructions, noting if it is out of square or not in plane.

(v) Ensure that the storm window is the correct size and type for the opening, including tolerances and provisions for adjustment to "out-of-squareness."

Note 2.—Aesthetically, it is desirable that the meeting rails or stiles of storm windows align with the meeting rails or stiles of the prime window.

(vi) Ensure that the storm window has not been damaged during shipping or assembly.

(vii) Ensure that adequate weepage is provided for exterior storm windows.

(2) *Installation Procedures.* (i) Do not install storm windows unless the pre-installation procedures have been carried out and any defects which were identified were corrected and their causes eliminated.

(ii) Give a liberal brush treatment of commercially available water repellent preservative to all cut or planed edges of wood storm windows.

(iii) Position storm windows to provide a minimum gap of ½ inch (13 mm) between the prime and storm glass.

(iv) Where both the storm and prime windows are metal, either position the storm window frame so it does not contact the prime window frame or secure a nonmetallic spacer between the prime and storm window frames.

Note 3.—The following materials are examples of acceptable spacers: ⅛ in. (3.2 mm) thick spacers of water repellent preservative treated wood, vinyl; rubber; or high density polyurethane.

(v) Secure aluminum storm windows only with aluminum or compatible stainless steel fasteners to avoid galvanic corrosion.

(vi) In exterior installed storm windows, seal the joints at jambs and head to resist rain penetration.

(vii) Seal indoor storm windows to provide greater airtightness than that of the prime window.

(3) *Post-Installation Procedures.* (i) Ensure that all weep holes are clear and provide complete drainage of the sill area.

(ii) Check removable storm windows for ease of removal and reinstallation. Ensure that storm windows fit snuggly with minimal apparent opportunity for air leakage through perimeter cracks.

(iii) Ensure that operable storm sash move freely within the storm frame and that all hardware operates properly.

(d) *Thermal Windows.* (See Figure 5).

(1) *Pre-Installation Procedures.* (i) Examine the existing window opening for signs of decay, corrosion or other deterioration.

(ii) Measure and plumb the window opening in accordance with the manufacturer's instructions, noting if it is out of square or not in plane to ensure the unit can be installed plumb, square and level.

(iii) Check for damage to interior finishes. If water damage is found to be caused by leakage from the outside, as opposed to condensate, locate the source of the leakage and establish whether replacing the window will correct the problem. If replacing the window will not correct the problem, take necessary corrective measures prior to installing the thermal window.

(iv) Ensure that the thermal windows are the correct size and type for the openings, including tolerances and provisions for adjustments to "out-of-squareness".

(v) Ensure that no thermal windows are damaged and, where sealed glass units are used, that their inside surfaces are free of condensation, fogging, or staining.

(vi) Ensure that the frames are free of any burrs or splinters, that the sash operate freely within the frame and latch securely, and that the weatherstripping is properly installed in all locations specified.

(2) *Installation Procedures.* (i) Do not install thermal windows unless the pre-installation procedures have been carried out and any defects which were identified were corrected and their causes eliminated.

(ii) Remove the existing window in a manner that will minimize damage to the remaining construction. Remove all fasteners and clear the frame opening of obstructions or protrusions that would interefere with the installation of the thermal window.

(iii) Examine exposed wall frame and remaining window construction and replace unsound material.

(iv) Where the existing window openings are reframed to a smaller size, insulate the voids between framing members and the window. Install a vapor barrier on the room side of the insulation.

(v) Install flashing at the head, jambs, and sill of the window as required to preclude the penetration of water into the wall cavity.

(vi) If a wood thermal window requires planing or cutting, finish all cut edges in accordance with paragraph (d)(2)(ii) of this section.

(vii) Anchor the unit in accordance with the manufacturer's instructions. Ensure that clearances specified in the manufacturer's instructions are maintained.

(viii) For aluminum units use only aluminum or compatible stainless steel anchors and fasteners.

(ix) Shim the thermal window as necessary to ensure it is plumb, square, and level.

(x) Separate metal thermal windows from incompatible materials (such as siding or frames of dissimilar metals) in the structure or frame with a nonmetallic spacer (see Note 3).

(xi) Fill all gaps of ¼ inch (6 mm) or more with backup or filler materials, such as nonabsorbing foam or sponge, before installing sealant.

(xii) Seal the joints between the supporting structure and window frame, using one of the following sealants: acrylic, butyl, chlorosulphonated polyethylene, polysulfide, polyurethane, or silicone. Apply sealants in accordance with the sealant manufacturer's instructions. Use only sealant materials which the manufacturer recommends for the intended application.

Note 1.—The seal between the supporting structure and the window frame should not be to a loose covering, such as siding or shingles, but to the sheathing below.

(3) *Post-Installation Procedures.* (i) Ensure that the sash move freely within the frames and that all hardward operates correctly.

(ii) Ensure that the window frame and sash are square, plumb, and level.

(iii) Ensure that all weatherstripping makes full contact with mating surfaces.

(e) *Multi-Glazing—Sealed Insulating Glass.* (See Figure 6).

(1) *Pre-Installation Procedures.* (i) Measure and plumb the opening for the sealed insulating glass unit. Note if it is out of square or not in plane.

(ii) Inspect the opening to ensure that there are no burrs, dirt, or deformation of glazing channels which may cause stress concentrations in the glass.

(iii) To prevent the prolonged exposure of sealed insulating glass edges to moisture, ensure that adequate weep holes are incorporated in the glazing system as recommended by the sealed insulating glass manufacturer.

Note 2.—Three (3) weep holes ⅜ inch (10 mm) or more in diameter, one each near the

jambs and one in the middle have been recommended by one manufacturer.

(iv) Ensure that clearances and nominal "bite" (containment of the glass) are as specified by the manufacturer.

(v) During handling place cushioning material between the glass and hard materials, and do not set the glass on hard surfaces or turn it on its corners. This can damage the glass or seal, or both.

(vi) Ensure that neither the glass nor the edge seal are damaged, and that the units exhibit no signs of fogging and condensation. Do not install defective units.

(2) *Installation Procedures.* (i) *Face Glazed Systems.* (A) Do not install sealed insulating glass units unless the pre-installation procedures have been carried out and any defects which were identified were corrected and their causes eliminated.

(B) Set the glass on two identical setting blocks of Shore A durometer 90 neoprene or equivalent material. The blocks are to be located equidistant from the center of the edge, preferably at the quarter points. They may, however, be moved towards the vertical edges but not closer than six (6) inches (150 mm) or one-eighth (⅛) the glass width, whichever is greater.

(C) Do not locate setting blocks so as to obstruct the weep holes provided in the glazing system.

(D) Use setting blocks that are narrower than the full channel width but that are at least 1/16 in. (1.5 mm) wider than the insulating glass and high enough to ensure minimal edge clearance but provide required bite for the glass.

(E) Install sealed insulating glass units containing heat absorbing or reflective glass so that the heat absorbing or reflective sheet is the outermost sheet. This allows the heat absorbing glass to radiate the greater part of absorbed heat to the outdoors, and the reflective glass to reflect the greater part of the inpinging solar radiation to the outdoors. Follow all additional precautions for installation prescribed by the manufacturer of the heat absorbing or reflective glass.

(F) Where necessary, set jamb blocks in place before installing glass to ensure proper lateral positioning of the glass. Maintain recommended clearances and bite.

(G) Use only continuous resilient spacers to maintain face clearances. Do not use intermittent shims.

(H) Install only glazing sealants that are resilient, nonhardening compounds, tapes, or gaskets. Install only those sealants recommended by the manufacturers of the unit and sealants recommended by their manufacturer for the intended use.

(I) Install glazing compounds with a slope so as to ensure rainwater runoff.

(ii) *Channel (Marine) Glazed Systems.* (A) Apply the wrap-around vinyl or neoprene in one piece around the entire perimeter of the sealed insulating glass, ensuring that the glass is engaged by the full channel depth of the wrap-around vinyl. Ensure that the seam in the wrap-around vinyl occurs at the head of the unit.

(B) Prevent corner bulges of wrap-around vinyl or neoprene, and provide for water drainage by a 90° cutout.

(C) Install only gaskets with a slope to ensure rainwater runoff.

(D) Install heat absorbing or heat reflective glass in accordance with the requirements of paragraph (2)(i)(E) above.

(3) *Post-Installation Procedures.* (i) Ensure that weep holes are not blocked.

(ii) Ensure that gaskets and sealants are properly installed.

(f) *Storm Doors.* (1) *Pre-Installation Procedures.* (i) Examine the framing of the prime door to ensure that it is sound, free of decay, and provides secure anchorage for the storm door.

(ii) Ensure that the frame contact areas are free of protrusions that would interfere with proper installation of the storm door.

(iii) Measure and plumb the door opening in accordance with the manufacturer's instructions, noting if it is out of square or not in plane.

(iv) Ensure that the storm door is the correct size and type for the opening, including tolerances and provisions for adjustment to "out-of-squareness."

(v) Ensure that the storm door has not been damaged.

(vi) Ensure that the storm door meets applicable standards for safety glazing.

(vii) Ensure that adequate weepage is provided on exterior storm doors.

(2) *Installation Procedure.* (i) Do not install storm doors unless the pre-installation procedures have been carried out and any defects which were identified, were corrected and their causes eliminated.

(ii) If required for proper fit, adjust the storm doors or their frames to the size and "out-of-squareness" of prime door frames.

(iii) Give a liberal brush treatment of commercially available water repellent preservative to all cut or planed edges of wood storm doors.

(iv) Anchor the storm doors to the framed openings in accordance with the manufacturer's instructions. Secure aluminum storm doors only with aluminum or compatible stainless steel fasteners to avoid galvanic corrosion.

(v) Install the door catches, closers, and chains in accordance with the manufacturer's instructions.

(vi) Install weatherstripping in accordance with the manufacturer's instructions.

(vii) Maintain a gap of at least 1/16 in. (1.5 mm) between the wood storm door and the frame openings unless otherwise specified by the manufacturer.

(viii) For an expander type aluminum storm door, ensure that the expander edges are flush with the frame opening. Secure the expander edges using hardware and fasteners compatible with aluminum.

(ix) Seal the joint between the storm door frame of a pre-hung storm door and the framed opening to prevent rain penetration.

(3) *Post-Installation Procedures.* (i) Ensure that adequate drainage is provided to prevent water accumulation at the sill.

(ii) Ensure that the storm door operates freely and does not bind when closed.

(iii) Ensure that the weatherstripping is installed properly and forms a weathertight seal.

(iv) Ensure that the closer and chain assemblies operate properly, that the door handles and latch assemblies properly secure and lock the storm door, and that hardware of the storm doors does not interfere with the operation of the prime doors.

(v) If the storm door includes an operable sash, ensure that the sash operates properly.

(g) *Thermal Doors.* (1) *Replacement of Door Leaf Only.* (i) *Pre-Installation Procedures.* (A) Examine the existing door frame to ensure that it is sound, free of decay or corrosion, and provides secure anchorage for the thermal door.

(B) Ensure that the frame contact areas are free of protrusions that would interfere with the proper installation of the thermal door.

(C) Measure and plumb the door opening in accordance with the manufacturer's instructions, noting if it is out of square or not in plane.

(D) Ensure that the thermal door is the correct size and type for the opening, including tolerances and provisions for adjustment to "out-of-squareness."

(E) Ensure that the thermal door has not been damaged.

(ii) *Installation Procedure.* (A) Do not install thermal doors unless the preinstallation procedures have been carried out and any defects which were identified, were corrected and their causes were eliminated.

(B) Give a liberal brush treatment of commercially water repellent preservative to all cut or planed edges of wood replacement doors.

(C) Anchor the thermal door to the existing frame in accordance with the manufacturer's instructions. Secure steel thermal doors with plated steel fasteners and aluminum thermal doors with aluminum or stainless steel fasteners to avoid galvanic corrosion. Install lock hardware in accordance with the lock manufacturer's installation instructions.

(D) Maintain a clearance of at least 1/16 inch (1.5 mm) between the thermal door and the door opening unless otherwise specified by the manufacturer.

(E) If the threshold does not seal tightly against the botton cap of the thermal door, replace the threshold.

(iii) *Post-Installation Procedures.* (A) Ensure that adequate drainage is provided to prevent water accumulation at the threshold.

(B) Ensure that the thermal door operates freely and does not bind when closed.

(C) Ensure that weatherstripping is installed properly and forms a weathertight seal.

(D) Ensure that the threshold is adjusted to provide a tight seal against the botton edge of the door.

(E) Ensure that door catches, handles, and latch assemblies properly secure and lock the replacement door.

(F) Ensure that the entire wood door including top and bottom edges is painted, varnished or sealed as required.

(2) *Replacement of Door Frame.* (i) *Pre-Installation Procedures.* (A) Remove the existing door frame in a manner that will minimize damage to the remaining construction. Remove all fasteners and clear damage to the remaining construction. Remove all fasteners and clear the frame opening of obstructions or protrusions that would interfere with the installation of the replacement door frame.

(B) Examine the existing rough framing for signs of decay, corrosion, or other deterioration to provide secure anchorage for the replacement frame.

(C) Measure and plumb the door opening, and note if it is out of square or not in plane.

(D) Ensure that the replacement frame and/or its parts have not been damaged.

(ii) *Installation Procedure.* (A) Do not install replacement door frames unless the pre-installation procedures have been carried out, any identified defects corrected and their causes eliminated.

(B) Give a liberal brush treatment of commercially available water repellent preservative to all cut or planed edges of replacement door frames.

(C) Install flashing at head, jambs and sill as required to preclude the penetration of water into the wall cavity.

(D) Anchor the replacement door frame to the rough opening. Secure wood and steel frames with plated steel fasteners and aluminum frames with aluminum or stainless steel fasteners to avoid galvanic corrosion.

(E) Shim frame to provide an opening that is plumb and square, giving particular attention to jamb at lockstrike and hinges.

(F) Seal the joints between the supporting structure and replacement door frame in accordance with the provisions of paragraph (d)(2) (x) and (xi).

(G) Install the door leaf in accordance with paragraph (i)(1). Do not prepare the door frame for lock hardware until the installation of the door leaf.

(iii) *Post-Installation Procedures.* (A) Ensure that adequate drainage is provided to prevent water accumulation at the sill.

(B) Ensure that the replacement frame provides an opening that is plumb and square.

(C) Ensure that weatherstripping is installed properly and forms a weathertight seal.

(D) Ensure that all parts of a wood frame are painted, varnished, or sealed as required.

(3) *Pre-Hung Doors.* (i) *Pre-Installation Procedures.* Conduct pre-installation inspection and preparation according to the provisions of paragraph (g)(2)(i) of this section.

(ii) *Installation Procedure.* (A) Conduct installation according to the provisions of paragraph (g)(2)(ii) of this section.

(B) Do not use excessive force when installing the pre-hung door into the opening.

(C) Anchor the pre-hung door to the opening in accordance with the manufacturer's instructions.

(iii) *Post-Installation Procedures.* Conduct post-installation inspection according to the provisions of paragraphs (g)(1)(iii) and (g)(2)(iii) of this section.

**§ 456.912 Standard practice for the installation of insulation on gas-fired, oil-fired, and electric resistance water heaters.**

(a) *Scope.* This practice covers the installation of insulation around gas-fired, oil-fired, and electric resistance water heaters.

(b) *Pre-installation Procedures.* (1) *General.* Determine the fuel type (gas, electric, oil) of the water heater.

(2) *Electric Resistance Water Heater.* Determine the location of the pressure relief valve, thermostat control, and hi-limit switch (see Figure 7).

(3) *Gas-Fired Water Heater.* (i) Determine whether the gas-fired water heater is equipped with a vent damper. Do not insulate gas-fired water heaters so equipped.

(ii) Determine the location of the pressure relief valve and draft hood on the water heater (see Figure 8).

(iii) Determine the location of the burner air inlet, pilot light access plate, and drain valve (see Figure 8).

(4) *Oil-Fired Water Heater.* (i) Determine the location of the pressure relief valve, vent pipe, and barometric draft gauge (see Figure 9).

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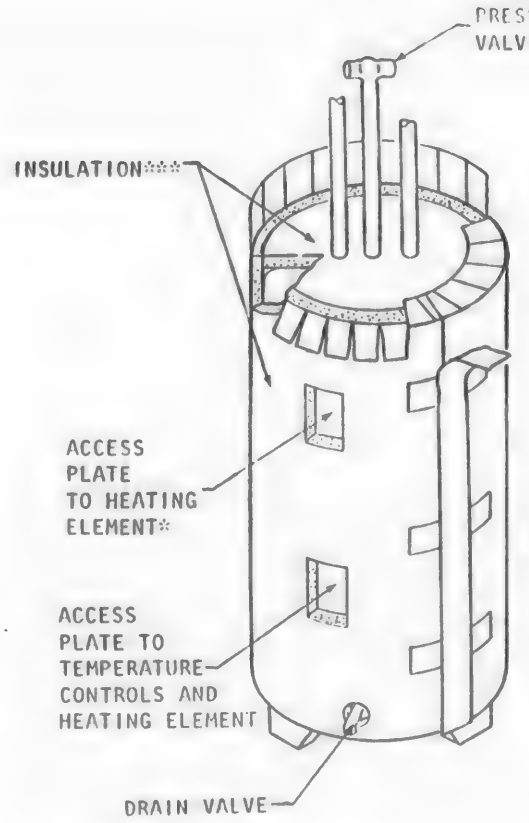


Figure 7. Electric Water Heater

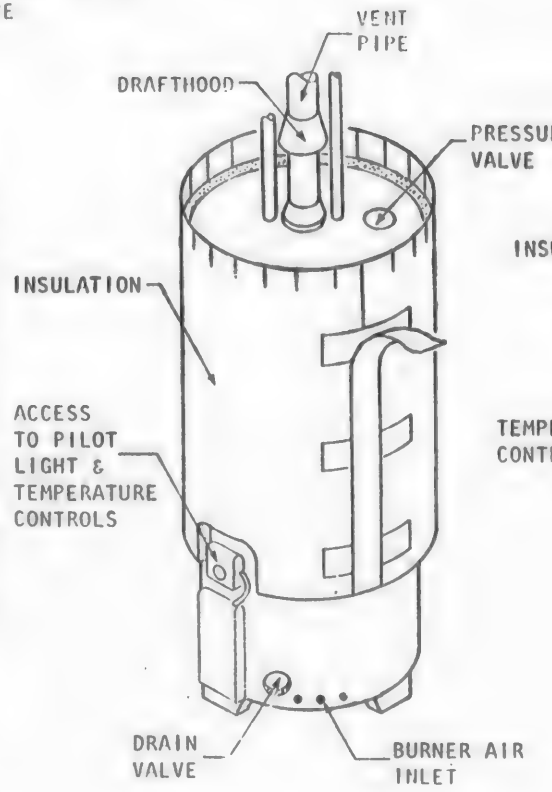


Figure 8. Gas-Fired Water Heater

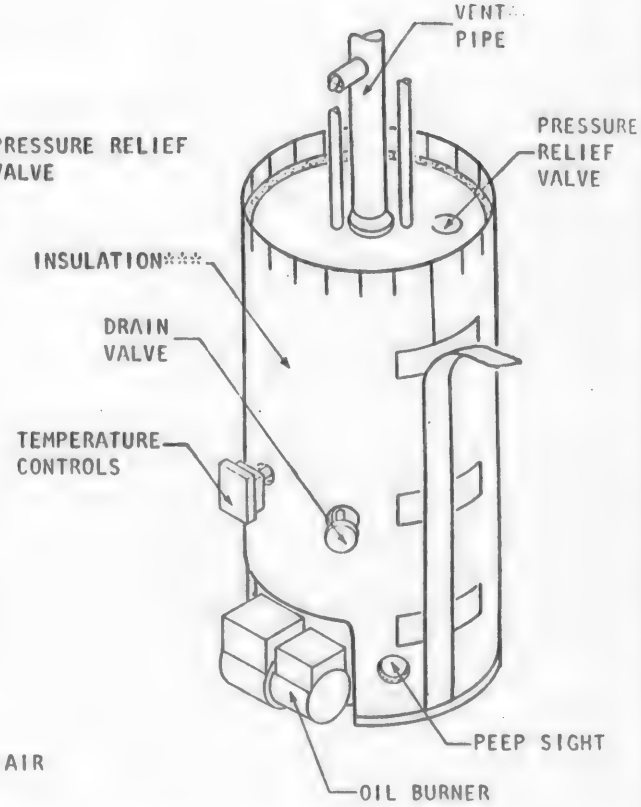


Figure 9. Oil-Fired Water Heater

* Only found on water heaters with two heating elements.

** The pipe may be side-mounted.

***Top insulated on all electric water heaters and oil-fired water heaters with side-mounted flue pipes.

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(ii) Determine the location of the thermostat control, peep sight and drain valve (see Figure 9).

(c) *Installation Procedures.* (1) *General.* (i) Do not install insulation unless the pre-installation procedures have been carried out.

(ii) Handle insulation in accordance with manufacturer's instructions and keep dry and free of extraneous materials.

(iii) Apply the insulation to the water heater with the facing to the outside.

(iv) Secure the sections of insulation to the water heater using a tape of the size and type recommended by the insulation manufacturer.

(v) Do not install insulation over the water heater operating instructions and other components identified below.

(2) *Electric Resistance Water Heater.* (i) Install insulation on the sides and top plate of the water heater.

(ii) Cut the insulation to leave holes for the pressure relief valve, thermostat control, hi-limit switch, plumbing pipes and other necessary access plates.

(3) *Gas-Fired Water Heater.* (i) Do *not* install insulation on the top plate of gas-fired water heaters.

(ii) Cut the insulation to leave holes for the burner air inlet, thermostat control, pilot light access plate, drain valve, plumbing pipes and other necessary access plates.

(4) *Oil-Fired Water Heaters.* (i) If the vent pipe is top-mounted, do *not* install insulation on the top plate of the water heater.

(ii) If the vent pipe is side mounted, maintain the minimum vent connector clearances specified in the latest edition of NFPA 211, Standard for Chimneys, Fireplaces, and Vents.

(iii) Cut the insulation to leave holes for the pressure relief valve, thermostat control, flame peep sight, burner access plate, drain valve, plumbing pipes and other necessary access plates.

(d) *Post-installation Procedures.* (1) Ensure that the insulation is securely attached to the water heater.

(2) Ensure that the required clearances have been maintained around vent pipes and that insulation has not been installed on the top of oil-fired water heaters which have a top-mounted vent pipe or gas-fired water heaters.

(3) Ensure that air inlets, access plates, drain valves, temperature controls, and pressure relief valves are not covered by insulation.

**§ 456.913 Standard practice for the installation of replacement oil burners.**

(a) *Scope.* (1) This practice provides minimum requirements for the installation of replacement oil burners for the purpose of significantly reducing the amount of fuel oil consumed by increasing combustion efficiency and reducing firing rate. It is intended for use on warm air, hot water, and steam systems, but does not cover firing rate reductions for steam heating systems.

(2) This practice covers the installation process from pre-installation inspection for inefficient operation through post-installation tune-up for best efficiency. Special considerations for maximizing system efficiency are emphasized.

(3) This practice is intended for use by approved installers. It outlines the general procedure to be followed, but leaves the detailed step-by-step methodology to the approved installers. It is therefore not intended for use by the general public or by untrained persons, since such use may be unsafe or result in damaged equipment.

(b) *Tune-up and Evaluation of Existing Burner.* (1) Clean, adjust, and measure the efficiency of the existing burner. Carry out the following procedures:

(i) Clean soot from heat transfer surfaces.

(ii) Seal air leaks around burner tube, clean-out doors, and seal secondary air dampers and firing doors on converted coal burners.

(iii) Clean or replace air filter.

(iv) Clean or replace oil filters.

(v) Check flame ignition. Ignition should be nearly instantaneous. Adjust electrodes or make other repairs necessary to achieve nearly instantaneous ignition.

(vi) Observe flame color. Repair or adjust burner to achieve an acceptable flame color for the type of furnace being evaluated.

(vii) Observe flame shape. If the flame is lopsided or distorted, replace the nozzle, adjust the electrodes or repair the air cone.

(viii) Check for flame impingement on walls of furnace or combustion chamber. Correct impingement resulting in soot or petroleum coke deposits on the target wall.

(ix) Check for flame cut off. The flame should disappear within three seconds of cut off. If the flame lingers check that the burner is level. It may be necessary to install an oil supply line solenoid to insure rapid cut off.

(x) If possible check the nozzle size, type, and spray angle against the burner specifications recommended by the manufacturer. Manufacturers' nozzle specifications should always be followed.

(xi) Start the burner. Determine and correct the cause of any abnormal starting of running noise.

(xii) Measure either flue or over-fire draft as specified by the manufacturer. Adjust draft regulator to provide the manufacturer specified draft. Ensure the draft regulator is operating smoothly.

(xiii) Check oil supply pressure. Adjust pressure regulator to manufacturer's specification.

(xiv) Check oil pressure entering pump. Reading should be two to six inches of mercury vacuum when the tank is below the burner and zero or above when the tank is above the burner. If there is a low reading, correct a possible restriction in the fuel supply.

(xv) Allow the burner to run at least 15 minutes to reach a steady state operating condition. Check for odor at observation port and draft regulator and, if appropriate, correct improper draft, improper venting, or a defective nozzle.

(xvi) Adjust the air gate to give a smoke reading of #1 or greater when measured in accordance with the procedure outlined in American National Standard ANSI/ASTM D2156–65 (1975 [after (xvii) has been completed, restore burner to a smoke reading of #1 or less].)

(xvii) Measure the flue gas temperature and the percentage of $CO_2$ in the flue gas through a ¼" diameter hole in the flue located between the barometric draft regulator and the furnace outlet.

(xviii) Using Figures 10 or 11 determine the steady state efficiency of the furnace from the flue gas temperature and percent $CO_2$ concentration. As an alternative, steady state efficiency may be calculated using the procedures given in Appendix A.

(c) *Replacement Criteria.* (1) Replace the burner only if the estimated savings resulting from installation of a more efficient burner will pay for the cost of the replacement burner. If the savings calculated in Table (2) below, multiplied by the homeowner's desired payback period in years exceed the total cost of burner replacement (labor plus parts), the burner should be replaced.

(2) Table 2 shows the annual dollar savings per $100 of annual fuel costs that can be achieved by increasing furnace efficiency. The efficiency of the furnace with a new burner conforming to the requirements of ANSI Z91.2 may be estimated by assuming a stack $CO_2$ concentration of 10 percent and a stack temperature equal to that measured in (b)(1)(xviii). If the burner manufacturer specifies a $CO_2$ concentration greater than 10 percent for his burner when tested in accordance with ANSI Z91.2, this should be used instead of the minimum value of 10 percent which that standard requires.

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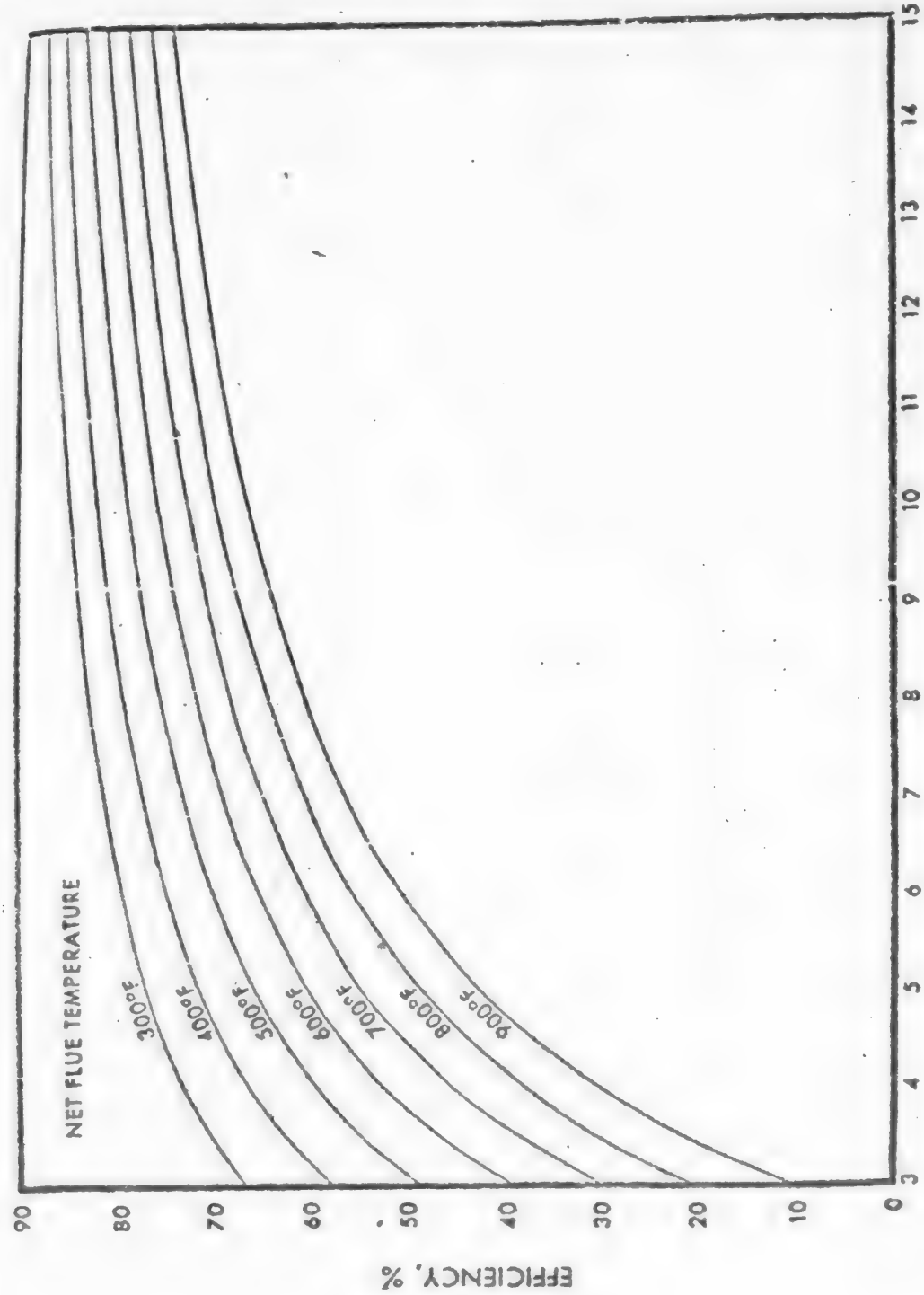


Figure 10. Effect of net flue temperature and percent $CO_2$ on efficiency for furnaces operating on No. 1 heating oil.

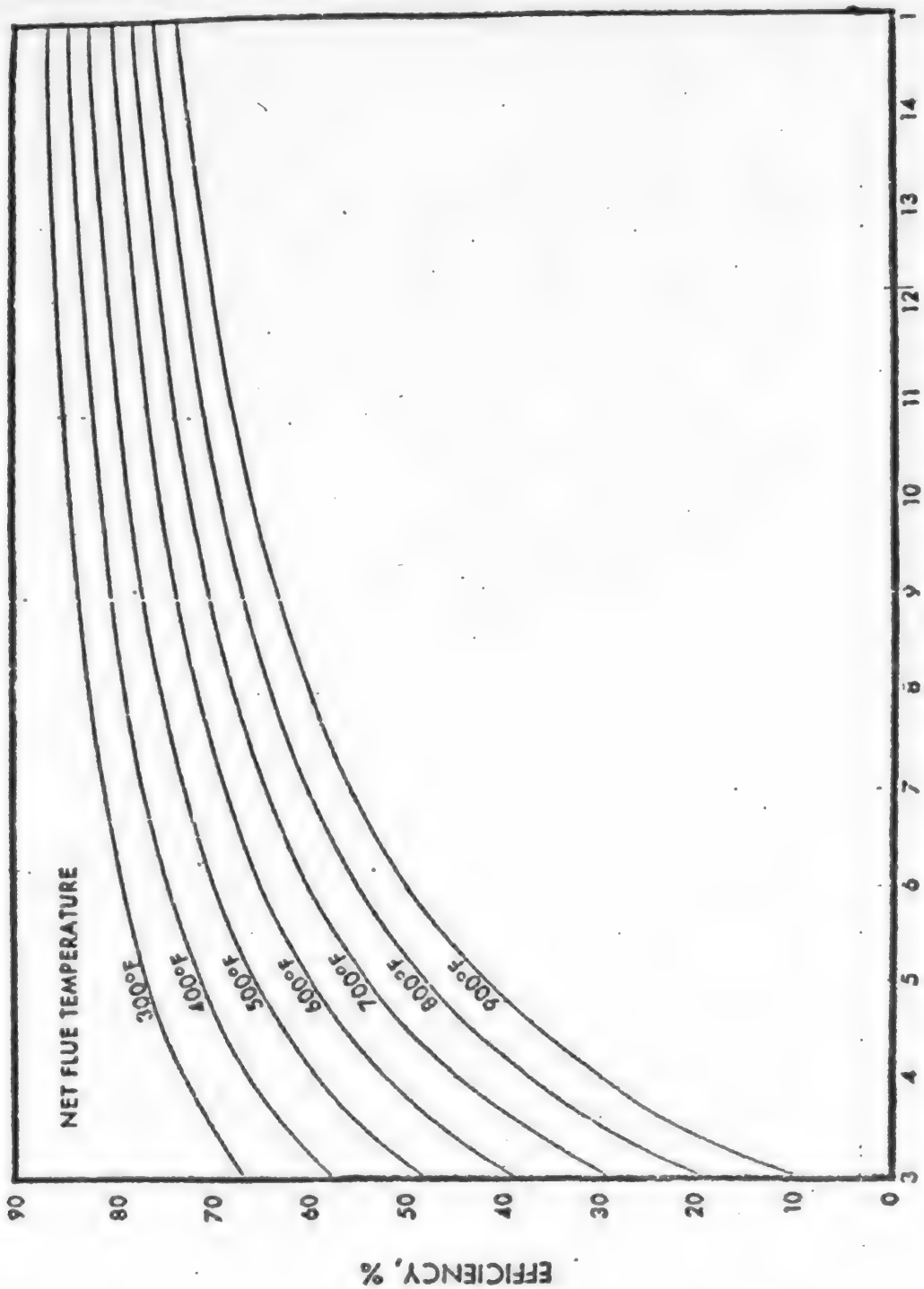


Figure 11. Effect of net flue temperature and percent $CO_2$ on efficiency for furnaces operating on No. 2 heating oil.

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Table 2.—*Annual Dollar Savings Per $100 of Annual Fuel Cost as a Result of Increased Furnace Efficiency*

| From original efficiency * of | To an increased efficiency of (percent) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 74 | 76 | 78 | 80 | 82 | 84 | 86 |
| Percent: | | | | | | | |
| 50 | $32.40 | $34.20 | [illegible] | $37.50 | [illegible] | $40.50 | $41.90 |
| 52 | 29.70 | 31.60 | 33.30 | 35.00 | 36.60 | 38.10 | 39.50 |
| 54 | 27.00 | [illegible] | 30.80 | 32.50 | 34.10 | 35.70 | 37.20 |
| 56 | 24.30 | 26.30 | 28.20 | [illegible] | 31.70 | 33.30 | 34.90 |
| [illegible] | 21.60 | 23.70 | 25.60 | 27.50 | 29.30 | 31.00 | 32.60 |
| 60 | 18.90 | 21.10 | 23.10 | 25.00 | [illegible] | 28.60 | 30.20 |
| 62 | 16.20 | 18.40 | 20.50 | 22.50 | 24.40 | 26.20 | 27.90 |
| 64 | 13.50 | 15.80 | 17.90 | 20.00 | 22.00 | 23.80 | 25.60 |
| [illegible] | 10.80 | 13.20 | 15.40 | 17.50 | 19.50 | 21.40 | 23.30 |
| 68 | 8.10 | 10.50 | 12.80 | 15.00 | 17.10 | 19.00 | 20.90 |
| 70 | 5.40 | 7.90 | 10.30 | 12.50 | 14.60 | 16.70 | 18.60 |
| 72 | 2.70 | 5.30 | 7.70 | 10.00 | 12.20 | 14.30 | 16.30 |
| 74 | | 2.60 | 5.10 | 7.50 | [illegible] | 11.90 | 14.00 |
| 76 | | | [illegible] | [illegible] | 7.30 | 9.50 | 11.60 |

* The original furnace efficiency is the value calculated in paragraph (b)(1)(xviii) of this section.

As an example, if the original stack conditions were 6 percent $CO_2$ and 500°F (72 percent efficiency) and the manufacturer of the replacement burner stated that 12 percent $CO_2$ was obtainable with his burner, the assumed new conditions with the replacement burner installed would be 12 percent $CO_2$ and 500°F (81 percent efficiency).* Using these two values an estimated annual saving of $11.10 per $100 of annual fuel cost can be read. If the annual fuel costs were $500, the annual savings would be $11.10 x 5=$55.50. If the desired payback period were seven years, the total savings justifying burner replacement would be $55.50 x 7=$388.50. In this example the burner should be replaced if the total replacement cost (labor plus parts) is less than $388 and should not be replaced if the total replacement cost is more than $388. Use an additional average savings of $5.80 per $100 of annual fuel cost in the payback period claculation if the firing rate of the new burner is optimized as described in paragraph (d)(1) of this section and the resulting value is smaller than the original firing rate by 20 percent or more [see paragraph (d)(1) of this section].

(d) *Selection of Replacement Burner.* (1) Determine design nozzle size. Using the local outdoor design temperature for the area and the measured average winter K-factor for the residence (degree days per gallon) determine the minimum nozzle size by the formula:

$$\text{minimum nozzle size} = \frac{(65 - T_D)}{(\text{K-factor})(24)} \times \frac{\text{Efficiency of Furnace Measured in (b)(1)(xviii)}}{\text{Expected Efficiency of Furnace with New Burner as calculated in (c)(2)}}$$

Where $T_D$ is the local outdoor design temperature in °F and the K-Factor is in degree days per gallon of oil. If the outdoor design temperature is not known, refer to Chapter 33 of the ASHRAE Handkbook and Product Directory—1977 Fundamentals. Use the 97.5 percent values for the nearest weather station listed. The winter K-factor is an average value derived over one or more complete heating seasons. The K-factor for a residence is defined as the number of degree days occurring in a time period divided by the total number of gallons of oil used during the same period to maintain a house at its normal thermostat setting. Determine from the occupant whether storm windows or a substantial amount of new insulation has been installed since the last heating season. If so, the calculation of the K-factor with the above formula may be too low and must be adjusted accordingly. If the heat requirement of the house has been significantly reduced by insulation or storm windows, it may also be possible to reduce the cut-off set point of the aquastat on hot water boilers by 10° to 20° F to reduce standby heat losses. This setback may not be desirable, however, if the boiler is used to heat domestic hot water. Thermostat setback is to be encouraged as an additional energy conservation practice. If the owner plans to practice nighttime setback, in order to insure adequate temperature recovery, increase the size of the burner replacement nozzle by adding a value in gallons per hour equal to the heated house floor area in square feet, times the pickup capacity factor (PCF), divided by 140,000, where PCF is given by the following table:

| Outdoor design temperature, °F: | *Pickup capacity factor,* * *Btu/hour/sq. foot* [illegible] |
|---|---|
| 40 | 9.5 |
| 30 | 13.0 |
| 20 | 14.9 |
| 10 | 15.8 |
| 0 | 17.0 |
| −10 | 17.7 |
| −20 | 18.8 |

* This table is based upon a 10° thermostat setback and a 2-hour pickup time.

Select a nozzle that gives the spray pattern and angle recommended by the manufacturer of the replacement burner that is not larger than the original nozzle.

(2) Choose the replacement burner recommended by its manufacturer for use with the design nozzle size calculated in paragraph (d)(1) of this section.

(3) Do not select a flame retention replacement burner for use on a hot water or steam boiler equipped with stainless steel combustion chambers. Higher temperature levels produced by high performance flame retention burners may cause the combustion chamber to burn out.

(e) *Installation of Replacement Burner.* (1) Install fixed firing rate replacement burners with a nozzle of the size calculated in paragraph (d)(1) of this section.

(2) Replace the burner in accordance with the manufacturer's instructions following normal, good installation practices.

(3) It is anticipated that most burner replacements will involve replacing a conventional burner with a high speed, flame retention head burner. If this is done, the combustion chamber must be brought into conformance with the burner manufacturer's specifications for

* Instructions for calculating furnace efficiency are given in Appendix A, Steady State Efficiency.

size and design. In addition, the combustion chamber material must have a minimum rating of 2300°F (most existing chambers for conventional burners have a rating of 1800°F).

(4) Check that the completed installation is in conformance with all local and state building and fire safety codes. Where local codes do not exist verify conformance with American National Standard Installation of Oil Burning Equipment, Z95.1–1974 (NFPA No. 31–1974).

(5) Test-operate the installed burner and measure its efficiency following the guidelines of U.S. Environmental Protection Agency Report No. EPA 600/2–75–069a (October 1975), "Guidelines for Residential Oil Burner Adjustments." If the replacement burner results in an appreciable reduction in stack temperature, the stack switch heat controls (if the unit is so equipped) for ignition cutoff may need to be readjusted.

(6) The temperature of the combustion gases entering the draft regulator must be at least 370°F for chimneys enclosed within the insulated structure to prevent condensate and subsequent corrosion. The temperature of the combustion gases entering the draft regulator must be at least 450°F if 2 or 3 sides of the chimney are exposed to an outdoor ambient design temperature of 0°F or less to prevent condensation and freezing within the chimney. If the temperature of the combustion gases entering the draft regulator is below the specified minimum value, fit a larger nozzle to increase that temperature.

(f) *Data to be Recorded.* Record the following information in duplicate and leave one copy with the owner and one as a tag attached to the equipment.

(1) Date of replacement.

(2) Identity of installing mechanic and company.

(3) The original burner make, model, model number, and nozzle size.

(4) The replacement burner make, model number, and nozzle size.

(5) The number and size of any additional nozzles tried in the replacement burner.

(6) Other modifications to the unit.

(7) The initial and final $CO_2$ net stack temperature, efficiency, and smoke readings.

**§ 456.914 Standard practice for the installation of vent dampers and electric ignition devices. [Reserved]**

## Appendix A to Subpart I, Part 456—Steady State Efficiency

The steady state efficiency of the furnace may be determined directly from Table 1 for furnaces using No. 2 fuel oil.

Alternatively the following equations may be used to calculate the furnace efficiency:

$$N_{SS} = 100 - L_{L,A} - L_{S,SS,A}$$

$$R_{T,F} = A + \frac{B}{X_{CO_2,S}}$$

$$L_{S,SS,A} = \frac{100}{HHV_A} \sum_{i=1}^{5} [(i + A/F\ (CF(i) + (A/F)\ (R_{T,F} - 1)\ (CA(i))] \times [(TF,SS + 460)^i - (TRA + 460)^i]$$

Where:

$N_{SS}$ = Steady state, full load efficiency %

$L_{L,A}$ = Average latent loss, % = 6.55 for No. 1 oil, 6.50 for No. 2 oil

$L_{S,SS,A}$ = Average sensible heat loss, %

$R_{T,F}$ = Ratio of combustion air to stoichiometric air

$X_{CO2,F}$ = Concentration by volume of $CO_2$ present in dry flue gas, %

$T_{F,SS}$ = Flue gas temperature at steady-state, °F

$T_{RA}$ = Ambient temperature in furnace room, °F

Additional required constants are as follows:

| | For No. 1 oil | For No. 2 oil |
|---|---|---|
| HHVA | 19,800 | 19,500 |
| A/F | 14.56 | 14.49 |
| A | 0.0679 | 0.06668 |
| B | 14.22 | 14.22 |
| CF (1) | $2.4416834\times10^{-1}$ | $2.4361163\times10^{-1}$ |
| CF (2) | $3.3711449\times10^{-6}$ | $3.6702686\times10^{-6}$ |
| CF (3) | $8.8906305\times10^{-9}$ | $8.7098897\times10^{-9}$ |
| CF (4) | $-1.3619019\times10^{-13}$ | $-1.3094378\times1^{-13}$ |
| CF (5) | $-1.4367410\times10^{-16}$ | $-1.5029209\times1^{-16}$ |

| | For Air |
|---|---|
| CA (1) | $2.5462121\times10^{-1}$ |
| CA (2) | $-3.0260126\times10^{-5}$ |
| CA (3) | $2.7608571\times10^{-9}$ |
| CA (4) | $-7.4253321\times10^{-13}$ |
| CA (5) | $6.4307377\times10^{-16}$ |

This calculation procedure is explained more fully in: NBSIR 78–1543, "Recommended Testing and Calculation Procedures for Determining the Seasonal Performance of Residential Control Furnaces and Boilers." Department of Energy "Final Energy Conservation Test Procedures" Federal Register, Part II, May 10, 1978. 43 FR 20128, 20147.

## Appendix I to Part 456—Program Measures

(a) *Climate Zones for Program Measures.* In the table of program measures shown in (c) below, the climate zones are as follows:

| Climate: | *Heating degree-days* |
|---|---|
| 1 | 0–1000. |
| 2 | 1001–2500. |
| 3 | 2501–3500. |
| 4 | 3501–4500. |
| 5 | 4501–5000. |
| 6 | 5001–6000. |
| 7 | 6001–7000. |
| 8 | 7001 and above. |

(b) *Category of Residential Buildings.* The program measures are designated in the following tables by categories of residential buildings. These categories are:

(1) For energy conservation measures and wind energy devices:

(i) "Electricity", which includes all residential buildings in which the principal source of space heating is an electric resistance heating system;

(ii) "Gas", which includes all residential buildings in which either natural gas, propane, or butane is the principal space heating fuel;

(iii) "Oil", which includes all residential buildings in which either #2 heating oil or kerosene is the principal space heating fuel, and includes all other residential buildings not included in the categories "Electricity", "Gas", or "Heat Pump";

(iv) "Heat Pump", which includes all residential buildings in which the principal source of space heating is an electric heat pump;

(2) For solar domestic hot water systems:

(i) "Electricity", which includes all residential buildings in which electricity is the principal fuel for domestic water heating;

(ii) "Gas", which includes all residential buildings in which either natural gas, propane, or butane is the principal fuel for domestic water heating; and

(iii) "Oil", which includes all residential buildings in which #2 heating oil or kerosene is the principal fuel for domestic water heating, and includes all other residential buildings not included in the categories of "Gas" or "Electricity";

(3) For active solar space heating systems and for combined active solar space heating and solar domestic hot water systems, "Electricity", "Gas", "Oil", and "Heat Pump" (as in (1) above) with respect to each of the following building types:

(i) "Single-family detached", which includes any residential building which contains only one dwelling unit and which is not attached to any other residential building;

(ii) "Attached buildings", which includes any residential building which either contains more than one dwelling unit or which is attached to another residential building or both; and

(iii) "Mobile homes".

(4) For passive solar space heating and cooling systems and for replacement solar swimming pool heaters, "all residential buildings."

(c)(1) The following are Program measures for all categories of buildings in all States and climate zones:

(i) replacement furnaces or boilers,

(ii) replacement central air conditioning,

(iii) caulking and weatherstripping,

(iv) duct insulation,

(v) pipe insulation,

(vi) water heater insulation,

(vii) heat reflective and heat absorbing window or door material,

(viii) clock thermostats

(ix) passive solar space heating and cooling systems.

(2) *Devices associated with electric load management techniques:* Devices associated with electric load management techniques are program measures for all categories of residential buildings if the local electric utility offers a residential rate which reflects any differences in the utility's cost-of-service (either energy or demand costs) between peak and off-peak periods.

(3) *Furnace replacement burners (oil).* Furnace replacement burners (oil) are program measures for the category "oil" in all States and climate zones.

(4) *Flue opening modifications.* Flue opening modifications are program measures for the category "gas" in all States and climate zones.

(5) *Replacement solar swimming pool heaters.* Replacement solar swimming pool heaters are program measures in all residential buildings with non-solar heated swimming pools in all States and climate areas.

(6) *Electrical or mechanical ignition systems.* Electrical or mechanical ignition systems are program measures for the category "gas" in all States and climate zones.

(d) *Table of Program Measures by State.* All other Program measures are displayed in the following table organized by State:

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| STATE | HUD/MPS REGION | CATEGORY OF RESIDENTIAL BUILDING | CONSERVATION MEASURES | | | | | RENEWABLE RESOURCE MEASURES | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ceiling Insulation (R-Value)* | Wall Insulation | Floor Insulation (R-Value)* | Storm or Thermal Windows | Storm or Thermal Doors | Solar Domestic Hot Water Systems | Active Solar Space Heating Systems | Combined Active Solar Space Heating & Solar Domestic Hot Water Systems | Wind Energy Devices |
| Alabama | 2 | Electricity | 22 | X | | X | | x | | | |
| | | Gas | 19 | X | | | | | | | |
| | | Oil | 19 | X | | | | x | | | |
| | | Electric Heat Pump | 19 | X | | | | | | | |
| | 3 | Electricity | 30 | X | 11 | X | | x | | | |
| | | Gas | 22 | X | | | | | | | |
| | | Oil | 22 | X | | | | x | | | |
| | | Electric Heat Pump | 22 | X | | | | | | | |
| Alaska | 8 | Electricity | 38 | X | 19 | X | X | | | | x |
| | | Gas | 38 | X | 19 | X | X | | | | x |
| | | Oil | 38 | X | 19 | X | X | | | | x |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | x |
| Arizona | 1 | Electricity | 19 | X | | | | x | | 1,2,3 | |
| | | Gas | 19 | X | | | | x | | | |
| | | Oil | 19 | X | | | | x | | | |
| | | Electric Heat Pump | 19 | X | | | | | | | |
| | 2 | Electricity | 22 | X | | X | | x | 1 | 1,2,3 | |
| | | Gas | 19 | X | | | | x | | | |
| | | Oil | 19 | X | | | | x | | 1 | |
| | | Electric Heat Pump | 19 | X | | | | | | | |
| | 3 | Electricity | 30 | X | 11 | X | | x | 1 | 1,2,3 | |
| | | Gas | 22 | X | | | | x | | | |
| | | Oil | 22 | X | | | | x | 1 | | |
| | | Electric Heat Pump | 22 | X | | | | | | | |
| | 4 | Electricity | 30 | X | 19 | X | | x | 1 | 1,2,3 | x |
| | | Gas | 30 | X | 11 | X | | x | | | x |
| | | Oil | 30 | X | 11 | X | | x | 1 | 1,2 | x |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | x |
| | 5 | Electricity | 30 | X | 19 | X | X | x | 1 | 1,2,3 | |
| | | Gas | 30 | X | 11 | X | | x | | | |
| | | Oil | 30 | X | 11 | X | | x | 1 | 1,2 | |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | |
| | 6 | Electricity | 30 | X | 19 | X | X | x | 1,2,3 | 1,2,3 | |
| | | Gas | 30 | X | 11 | X | | x | 1 | 1,2 | |
| | | Oil | 30 | X | 11 | X | | x | 1,2 | 1,2,3 | |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | |
| | 7 | Electricity | 38 | X | 19 | X | X | x | 1,2,3 | 1,2,3 | |
| | | Gas | 30 | X | 11 | X | | x | 1 | 1,2 | |
| | | Oil | 30 | X | 11 | X | | x | 1,2 | 1,2,3 | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | |

NOTE: 1 = Single-family 2 = Attached buildings 3 = Mobile Homes

*These R-Values are minimums. The State may propose, in a State Plan, either (1) to substitute a higher level, subject to the Assistant Secretary's approval, as the program measure, or (2) to offer other levels (higher or lower) as States measures in addition to the program measures.

| STATE | HUD/MPS REGION | CATEGORY OF RESIDENTIAL BUILDING | CONSERVATION MEASURES | | | | | RENEWABLE RESOURCE MEASURES | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ceiling Insulation (R-Value)* | Wall Insulation | Floor Insulation (R-Value)* | Storm or Thermal Windows | Storm or Thermal Doors | Solar Domestic Hot Water Systems | Active Solar Space Heating Systems | Combined Active Solar Space Heating & Solar Domestic Hot Water Systems | Wind Energy Devices |
| Arkansas | 3 | Electricity | 30 | X | 11 | X | | x | | 1 | |
| | | Gas | 22 | X | | | | | | | |
| | | Oil | 22 | X | | | | x | | | |
| | | Electric Heat Pump | 22 | X | | | | | | | |
| | 4 | Electricity | 30 | X | 19 | X | | x | | 1,2 | x |
| | | Gas | 30 | X | 11 | X | | | | | x |
| | | Oil | 30 | X | 11 | X | | x | | | x |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | x |
| California | 2 | Electricity | 22 | X | | X | | x | 1 | 1 | x |
| | | Gas | 19 | X | | | | | | | x |
| | | Oil | 19 | X | | | | x | | 1 | x |
| | | Electric Heat Pump | 19 | X | | | | | | | x |
| | 3 | Electricity | 30 | X | 11 | X | | x | 1 | 1 | |
| | | Gas | 22 | X | | | | | | | |
| | | Oil | 22 | X | | | | x | | 1 | |
| | | Electric Heat Pump | 22 | X | | | | | | | |
| | 4 | Electricity | 30 | X | 19 | X | | x | 1 | 1 | x |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | x | 1 | 1 | |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | x |
| | 5 | Electricity | 30 | X | 19 | X | X | x | | | x |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | x | | | |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | x |
| | 6 | Electricity | 30 | X | 19 | X | X | x | | | x |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | x | | | |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | x |
| | 7 | Electricity | 38 | X | 19 | X | X | x | 1 | 1,2 | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | x | 1 | 1,2 | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | |
| | 8 | Electricity | 38 | X | 19 | X | X | x | 1 | 1,2 | |
| | | Gas | 38 | X | 19 | X | X | | | | |
| | | Oil | 38 | X | 19 | X | X | x | 1 | 1,2 | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | |
| Colorado | 6 | Electricity | 30 | X | 19 | X | X | x | 1 | 1 | x |
| | | Gas | 30 | X | 11 | X | | | | | x |
| | | Oil | 30 | X | 11 | X | | x | 1 | 1 | x |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | x |

NOTE: 1 = Single-family 2 = Attached buildings 3 = Mobile Homes

*These R-Values are minimums. The State may propose, in a State Plan, either (1) to substitute a higher level, subject to the Assistant Secretary's approval, as the program measure, or (2) to offer other levels (higher or lower) as States measures in addition to the program measures.

| STATE | HUD/MPS REGION | CATEGORY OF RESIDENTIAL BUILDING | CONSERVATION MEASURES | | | | | RENEWABLE RESOURCE MEASURES | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ceiling Insulation (R-Value)* | Wall Insulation | Floor Insulation (R-Value)* | Storm or Thermal Windows | Storm or Thermal Doors | Solar Domestic Hot Water Systems | Active Solar Space Heating Systems | Combined Active Solar Space Heating & Solar Domestic Hot Water Systems | Wind Energy Devices |
| Colorado (Continued) | 7 | Electricity | 38 | X | 19 | X | X | x 1 | | 1,2 | x |
| | | Gas | 30 | X | 11 | X | | | | | x |
| | | Oil | 30 | X | 11 | X | | x 1 | | 1,2 | x |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | x |
| | 8 | Electricity | 38 | X | 19 | X | X | x 1 | | 1,2,3 | |
| | | Gas | 38 | X | 19 | X | X | | | | |
| | | Oil | 38 | X | 19 | X | X | x 1 | | 1,2,3 | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | |
| Connecticut | 6 | Electricity | 30 | X | 19 | X | X | x | | | x |
| | | Gas | 30 | X | 11 | X | | | | | x |
| | | Oil | 30 | X | 11 | X | | | | | x |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | x |
| Delaware | 4 | Electricity | 30 | X | 19 | X | | x | | 1 | x |
| | | Gas | 30 | X | 11 | X | | | | | x |
| | | Oil | 30 | X | 11 | X | | x | | | x |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | x |
| District of Columbia | 4 | Electricity | 30 | X | 19 | X | | x | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | x | | | |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | |
| Florida | 1 | Electricity | 19 | X | | | | x | | | x |
| | | Gas | 19 | X | | | | | | | x |
| | | Oil | 19 | X | | | | x | | | x |
| | | Electric Heat Pump | 19 | X | | | | | | | x |
| | 2 | Electricity | 22 | X | | X | | x | | | |
| | | Gas | 19 | X | | | | | | | |
| | | Oil | 19 | X | | | | x | | | |
| | | Electric Heat Pump | 19 | X | | | | | | | |
| Georgia | 2 | Electricity | 22 | X | | X | | x | | | |
| | | Gas | 19 | X | | | | | | | |
| | | Oil | 19 | X | | | | x | | | |
| | | Electric Heat Pump | 19 | X | | | | | | | |
| | 3 | Electricity | 30 | X | 11 | X | | x | | | |
| | | Gas | 22 | X | | | | | | | |
| | | Oil | 22 | X | | | | x | | | |
| | | Electric Heat Pump | 22 | X | | | | | | | |
| | 4 | Electricity | 30 | X | 19 | X | | x | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | x | | | |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | |

NOTE: 1 = Single-family 2 = Attached buildings 3 = Mobile Homes

*These R-Values are minimums. The State may propose, in a State Plan, either (1) to substitute a higher level, subject to the Assistant Secretary's approval, as the program measure, or (2) to offer other levels (higher or lower) as States measures in addition to the program measures.

| STATE | HUD/MPS REGION | CATEGORY OF RESIDENTIAL BUILDING | CONSERVATION MEASURES | | | | | RENEWABLE RESOURCE MEASURES | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ceiling Insulation (R-Value)* | Wall Insulation | Floor Insulation (R-Value)* | Storm or Thermal Windows | Storm or Thermal Doors | Solar Domestic Hot Water Systems | Active Solar Space Heating Systems | Combined Active Solar Space Heating & Solar Domestic Hot Water Systems | Wind Energy Devices |
| Hawaii | 1 | Electricity | 19 | X | | | | X | | | X |
| | | Gas | 19 | X | | | | X | | | X |
| | | Oil | 19 | X | | | | X | | | X |
| | | Electric Heat Pump | 19 | X | | | | | | | X |
| Idaho | 7 | Electricity | 38 | X | 19 | X | X | | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | | | | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | |
| | 8 | Electricity | 38 | X | 19 | X | X | | | | |
| | | Gas | 38 | X | 19 | X | X | | | | |
| | | Oil | 38 | X | 19 | X | X | X 1 | | 1 | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | |
| Illinois | 4 | Electricity | 30 | X | 19 | X | | X | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | X | | | |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | |
| | 5 | Electricity | 30 | X | 19 | X | X | X | | | X |
| | | Gas | 30 | X | 11 | X | | | | | X |
| | | Oil | 30 | X | 11 | X | | X | | | X |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | X |
| | 6 | Electricity | 30 | X | 19 | X | X | X | | | X |
| | | Gas | 30 | X | 11 | X | | | | | X |
| | | Oil | 30 | X | 11 | X | | | | | X |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | X |
| | 7 | Electricity | 38 | X | 19 | X | X | X | | | X |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | | | | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | X |
| Indiana | 4 | Electricity | 30 | X | 19 | X | | X | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | | | | |
| | | Electric Heat Pump | 30 | X | 11 | X | | X | | | |
| | 5 | Electricity | 30 | X | 19 | X | X | X | | | X |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | | | | |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | X |
| | 6 | Electricity | 30 | X | 19 | X | X | X | | | X |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | | | | |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | X |

NOTE: 1 = Single-family 2 = Attached buildings 3 = Mobile Homes

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| STATE | HUD/MPS REGION | CATEGORY OF RESIDENTIAL BUILDING | CONSERVATION MEASURES | | | | | RENEWABLE RESOURCE MEASURES | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ceiling Insulation (R-Value)* | Wall Insulation | Floor Insulation (R-Value)* | Storm or Thermal Windows | Storm or Thermal Doors | Solar Domestic Hot Water Systems | Active Solar Space Heating Systems | Combined Active Solar Space Heating & Solar Domestic Hot Water Systems | Wind Energy Devices |
| Indiana (Continued) | 7 | Electricity | 38 | X | 19 | X | X | | | | x |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | | | | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | x |
| Iowa | 6 | Electricity | 30 | X | 19 | X | X | x | | | x |
| | | Gas | 30 | X | 11 | X | | | | | x |
| | | Oil | 30 | X | 11 | X | | x | | | x |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | x |
| | 7 | Electricity | 38 | X | 19 | X | X | x | | | x |
| | | Gas | 30 | X | 11 | X | | | | | x |
| | | Oil | 30 | X | 11 | X | | x | | | x |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | x |
| | 8 | Electricity | 38 | X | 19 | X | X | x | | | x |
| | | Gas | 38 | X | 19 | X | X | | | | x |
| | | Oil | 38 | X | 19 | X | X | x | | | x |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | x |
| Kansas | 4 | Electricity | 30 | X | 19 | X | | x | | | x |
| | | Gas | 30 | X | 11 | X | | | | | x |
| | | Oil | 30 | X | 11 | X | | x | | | x |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | x |
| | 5 | Electricity | 30 | X | 19 | X | X | x | | | x |
| | | Gas | 30 | X | 11 | X | | | | | x |
| | | Oil | 30 | X | 11 | X | | x | | | x |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | x |
| | 6 | Electricity | 30 | X | 19 | X | X | x | | | x |
| | | Gas | 30 | X | 11 | X | | | | | x |
| | | Oil | 30 | X | 11 | X | | x | | | x |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | x |
| | 7 | Electricity | 38 | X | 19 | X | X | x | | 1 | x |
| | | Gas | 30 | X | 11 | X | | | | | x |
| | | Oil | 30 | X | 11 | X | | x | | | x |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | x |
| Kentucky | 4 | Electricity | 30 | X | 19 | X | | x | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | x | | | |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | |
| | 5 | Electricity | 30 | X | 19 | X | X | x | | | x |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | x | | | |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | x |

NOTE: 1 = Single-family 2 = Attached buildings 3 = Mobile Homes

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| STATE | HUD/MPS REGION | CATEGORY OF RESIDENTIAL BUILDING | CONSERVATION MEASURES | | | | | RENEWABLE RESOURCE MEASURES | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ceiling Insulation (R-Value)* | Wall Insulation | Floor Insulation (R-Value)* | Storm or Thermal Windows | Storm or Thermal Doors | Solar Domestic Hot Water Systems | Active Solar Space Heating Systems | Combined Active Solar Space Heating & Solar Domestic Hot Water Systems | Wind Energy Devices |
| Kentucky (Continued) | 6 | Electricity | 30 | X | 19 | X | X | X | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | X | | | |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | |
| Louisiana | 2 | Electricity | 22 | X | | X | | X | | | X |
| | | Gas | 19 | X | | | | | | | |
| | | Oil | 19 | X | | | | X | | | |
| | | Electric Heat Pump | 19 | X | | | | | | | X |
| | 3 | Electricity | 30 | X | 11 | X | | X | | | |
| | | Gas | 22 | X | | | | | | | |
| | | Oil | 22 | X | | | | X | | | |
| | | Electric Heat Pump | 22 | X | | | | | | | |
| Maine | 8 | Electricity | 38 | X | 19 | X | X | | | | X |
| | | Gas | 38 | X | 19 | X | X | | | | X |
| | | Oil | 38 | X | 19 | X | X | | | | X |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | X |
| Maryland | 4 | Electricity | 30 | X | 19 | X | | X | | | X |
| | | Gas | 30 | X | 11 | X | | | | | X |
| | | Oil | 30 | X | 11 | X | | X | | | X |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | X |
| | 5 | Electricity | 30 | X | 19 | X | X | X | | | X |
| | | Gas | 30 | X | 11 | X | | | | | X |
| | | Oil | 30 | X | 11 | X | | X | | | X |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | X |
| | 6 | Electricity | 30 | X | 19 | X | X | X | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | X | | | |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | |
| Massachusetts | 6 | Electricity | 30 | X | 19 | X | X | X | | | X |
| | | Gas | 30 | X | 11 | X | | | | | X |
| | | Oil | 30 | X | 11 | X | | | | | X |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | X |
| | 7 | Electricity | 38 | X | 19 | X | X | X | | | X |
| | | Gas | 30 | X | 11 | X | | | | | X |
| | | Oil | 30 | X | 11 | X | | | | | X |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | X |
| Michigan | 7 | Electricity | 38 | X | 19 | X | X | X | | | X |
| | | Gas | 30 | X | 11 | X | | | | | X |
| | | Oil | 30 | X | 11 | X | | | | | X |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | X |

NOTE: 1 = Single-family 2 = Attached buildings 3 = Mobile Homes

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|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ceiling Insulation (R-Value)* | Wall Insulation | Floor Insulation (R-Value)* | Storm or Thermal Windows | Storm or Thermal Doors | Solar Domestic Hot Water Systems | Active Solar Space Heating Systems | Combined Active Solar Space Heating & Solar Domestic Hot Water Systems | Wind Energy Devices |
| Michigan (Continued) | 8 | Electricity | 38 | X | 19 | X | X | x | | | x |
| | | Gas | 38 | X | 19 | X | X | | | | x |
| | | Oil | 38 | X | 19 | X | X | | | | x |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | x |
| Minnesota | 8 | Electricity | 38 | X | 19 | X | X | x | | | x |
| | | Gas | 38 | X | 19 | X | X | | | | x |
| | | Oil | 38 | X | 19 | X | X | | | | x |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | x |
| Mississippi | 2 | Electricity | 22 | X | | X | | x | | | |
| | | Gas | 19 | X | | | | | | | |
| | | Oil | 19 | X | | | | x | | | |
| | | Electric Heat Pump | 19 | X | | | | | | | |
| | 3 | Electricity | 30 | X | 11 | X | | x | | | x |
| | | Gas | 22 | X | | | | | | | |
| | | Oil | 22 | X | | | | x | | | x |
| | | Electric Heat Pump | 22 | X | | | | | | | x |
| Missouri | 4 | Electricity | 30 | X | 19 | X | | x | | | x |
| | | Gas | 30 | X | 11 | X | | | | | x |
| | | Oil | 30 | X | 11 | X | | x | | | x |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | x |
| | 5 | Electricity | 30 | X | 19 | X | X | x | | | x |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | x | | | |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | x |
| | 6 | Electricity | 30 | X | 19 | X | X | x | | | x |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | x | | | |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | x |
| Montana | 8 | Electricity | 38 | X | 19 | X | X | | | | |
| | | Gas | 38 | X | 19 | X | X | | | | |
| | | Oil | 38 | X | 19 | X | X | x | | | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | |
| Nebraska | 6 | Electricity | 30 | X | 19 | X | X | x | | | x |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | x | | | |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | x |
| | 7 | Electricity | 38 | X | 19 | X | X | x | | | x |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | x | | | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | x |

NOTE: 1 = Single-family 2 = Attached buildings 3 = Mobile Homes

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| STATE | HUD/MPS REGION | CATEGORY OF RESIDENTIAL BUILDING | CONSERVATION MEASURES | | | | | RENEWABLE RESOURCE MEASURES | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ceiling Insulation (R-Value)* | Wall Insulation | Floor Insulation (R-Value)* | Storm or Thermal Windows | Storm or Thermal Doors | Solar Domestic Hot Water Systems | Active Solar Space Heating Systems | Combined Active Solar Space Heating & Solar Domestic Hot Water Systems | Wind Energy Devices |
| Nebraska (Continued) | 8 | Electricity | 38 | X | 19 | X | X | x 1 | | 1 | x |
| | | Gas | 38 | X | 19 | X | X | | | | |
| | | Oil | 38 | X | 19 | X | X | x | | | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | x |
| Nevada | 2 | Electricity | 22 | X | | X | | x 1,2 | | 1,2,3 | x |
| | | Gas | 19 | X | | | | x | | | |
| | | Oil | 19 | X | | | | x 1 | | 1,2,3 | |
| | | Electric Heat Pump | 19 | X | | | | | | | x |
| | 3 | Electricity | 30 | X | 11 | X | | x 1,2 | | 1,2,3 | x |
| | | Gas | 22 | X | | | | x | | | |
| | | Oil | 22 | X | | | | x 1 | | 1,2,3 | |
| | | Electric Heat Pump | 22 | X | | | | | | | x |
| | 4 | Electricity | 30 | X | 19 | X | | x 1,2 | | 1,2,3 | x |
| | | Gas | 30 | X | 11 | X | | x | | | |
| | | Oil | 30 | X | 11 | X | | x 1 | | 1,2,3 | |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | x |
| | 5 | Electricity | 30 | X | 19 | X | X | x 1,2 | | 1,2,3 | x |
| | | Gas | 30 | X | 11 | X | | x | | | |
| | | Oil | 30 | X | 11 | X | | x 1 | | 1,2,3 | |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | x |
| | 6 | Electricity | 30 | X | 19 | X | X | x 1 | | 1,2 | x |
| | | Gas | 30 | X | 11 | X | | x | | | |
| | | Oil | 30 | X | 11 | X | | x 1 | | 1 | |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | x |
| | 7 | Electricity | 38 | X | 19 | X | X | x 1 | | 1,2 | x |
| | | Gas | 30 | X | 11 | X | | x | | | |
| | | Oil | 30 | X | 11 | X | | x 1 | | 1 | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | |
| | 8 | Electricity | 38 | X | 19 | X | X | x 1 | | 1,2 | |
| | | Gas | 38 | X | 19 | X | X | | | | |
| | | Oil | 38 | X | 19 | X | X | x 1 | | 1 | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | |
| New Hampshire | 7 | Electricity | 38 | X | 19 | X | X | | | | x |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | | | | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | x |
| | 8 | Electricity | 38 | X | 19 | X | X | x | | | x |
| | | Gas | 38 | X | 19 | X | X | | | | |
| | | Oil | 38 | X | 19 | X | X | | | | x |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | |

NOTE: 1 = Single-family 2 = Attached buildings 3 = Mobile Homes

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|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ceiling Insulation (R-Value)* | Wall Insulation | Floor Insulation (R-Value)* | Storm or Thermal Windows | Storm or Thermal Doors | Solar Domestic Hot Water Systems | Active Solar Space Heating Systems | Combined Active Solar Space Heating & Solar Domestic Hot Water Systems | Wind Energy Devices |
| New Jersey | 5 | Electricity | 30 | X | 19 | X | X | X | | | X |
| | | Gas | 30 | X | 11 | X | | | | | X |
| | | Oil | 30 | X | 11 | X | | X | | | X |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | X |
| | 6 | Electricity | 30 | X | 19 | X | X | X | | | X |
| | | Gas | 30 | X | 11 | X | | | | | X |
| | | Oil | 30 | X | 11 | X | | | | | X |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | X |
| New Mexico | 3 | Electricity | 30 | X | 11 | X | | X 1 | | 1,2,3 | X |
| | | Gas | 22 | X | | | | X | | | X |
| | | Oil | 22 | X | | | | X | | 1 | X |
| | | Electric Heat Pump | 22 | X | | | | | | | X |
| | 4 | Electricity | 30 | X | 19 | X | | X 1 | | 1,2,3 | X |
| | | Gas | 30 | X | 11 | X | | X | | | X |
| | | Oil | 30 | X | 11 | X | | X 1 | | 1 | X |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | X |
| | 5 | Electricity | 30 | X | 19 | X | X | X 1 | | 1,2,3 | X |
| | | Gas | 30 | X | 11 | X | | X | | | X |
| | | Oil | 30 | X | 11 | X | | X | | 1 | X |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | X |
| | 6 | Electricity | 30 | X | 19 | X | X | X 1 | | 1,2,3 | X |
| | | Gas | 30 | X | 11 | X | | X | | | X |
| | | Oil | 30 | X | 11 | X | | X 1 | | 1,2 | X |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | X |
| | 7 | Electricity | 38 | X | 19 | X | X | X 1 | | 1,2,3 | X |
| | | Gas | 30 | X | 11 | X | | X | | | X |
| | | Oil | 30 | X | 11 | X | | X 1 | | 1,2 | X |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | X |
| | 8 | Electricity | 38 | X | 19 | X | X | X 1 | | 1,2,3 | X |
| | | Gas | 38 | X | 19 | X | X | X | | | X |
| | | Oil | 38 | X | 19 | X | X | X 1 | | 1,2 | X |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | X |
| New York | 6 | Electricity | 30 | X | 19 | X | X | X | | | X |
| | | Gas | 30 | X | 11 | X | | | | | X |
| | | Oil | 30 | X | 11 | X | | | | | X |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | X |
| | 7 | Electricity | 38 | X | 19 | X | X | X | | | X |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | | | | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | X |

NOTE: 1 = Single-family 2 = Attached buildings 3 = Mobile Homes

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| STATE | HUD/MPS REGION | CATEGORY OF RESIDENTIAL BUILDING | CONSERVATION MEASURES | | | | | RENEWABLE RESOURCE MEASURES | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ceiling Insulation (R-Value)* | Wall Insulation | Floor Insulation (R-Value)* | Storm or Thermal Windows | Storm or Thermal Doors | Solar Domestic Hot Water Systems | Active Solar Space Heating Systems | Combined Active Solar Space Heating & Solar Domestic Hot Water Systems | Wind Energy Devices |
| New York (Continued) | 8 | Electricity | 38 | X | 19 | X | X | X | | | X |
| | | Gas | 38 | X | 19 | X | X | | | | X |
| | | Oil | 38 | X | 19 | X | X | | | | X |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | X |
| North Carolina | 3 | Electricity | 30 | X | 11 | X | | X | | | X |
| | | Gas | 22 | X | | | | | | | |
| | | Oil | 22 | X | | | | X | | | |
| | | Electric Heat Pump | 22 | X | | | | | | | X |
| | 4 | Electricity | 30 | X | 19 | X | | X | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | X | | | |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | |
| | 5 | Electricity | 30 | X | 19 | X | X | X | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | X | | | |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | |
| North Dakota | 8 | Electricity | 38 | X | 19 | X | X | | | | X |
| | | Gas | 38 | X | 19 | X | X | | | | X |
| | | Oil | 38 | X | 19 | X | X | | | | X |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | X |
| Ohio | 6 | Electricity | 30 | X | 19 | X | X | | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | | | | |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | |
| | 7 | Electricity | 38 | X | 19 | X | X | | | | X |
| | | Gas | 30 | X | 11 | X | | | | | X |
| | | Oil | 30 | X | 11 | X | | | | | X |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | X |
| Oklahoma | 3 | Electricity | 30 | X | 11 | X | | X | | 1 | X |
| | | Gas | 22 | X | | | | | | | X |
| | | Oil | 22 | X | | | | X | | | X |
| | | Electric Heat Pump | 22 | X | | | | | | | X |
| | 4 | Electricity | 30 | X | 19 | X | | X | | 1 | X |
| | | Gas | 30 | X | 11 | X | | | | | X |
| | | Oil | 30 | X | 11 | X | | X | | | X |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | X |
| | 5 | Electricity | 30 | X | 19 | X | X | X | 1 | 1,2,3 | X |
| | | Gas | 30 | X | 11 | X | | | | | X |
| | | Oil | 30 | X | 11 | X | | X | 1 | 1 | X |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | X |

NOTE: 1 = Single-family 2 = Attached buildings 3 = Mobile Homes

*These R-Values are minimums. The State may propose, in a State Plan, either (1) to substitute a higher level, subject to the Assistant Secretary's approval, as the program measure, or (2) to offer other levels (higher or lower) as States measures in addition to the program measures.

| STATE | HUD/MPS REGION | CATEGORY OF RESIDENTIAL BUILDING | CONSERVATION MEASURES | | | | | RENEWABLE RESOURCE MEASURES | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ceiling Insulation (R-Value)* | Wall Insulation | Floor Insulation (R-Value)* | Storm or Thermal Windows | Storm or Thermal Doors | Solar Domestic Hot Water Systems | Active Solar Space Heating Systems | Combined Active Solar Space Heating & Solar Domestic Hot Water Systems | Wind Energy Devices |
| Oklahoma (Continued) | 6 | Electricity | 30 | X | 19 | X | X | X 1 | | 1,2,3 | x |
| | | Gas | 30 | X | 11 | X | | | | | x |
| | | Oil | 30 | X | 11 | X | | X 1 | | 1 | x |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | x |
| Oregon | 4 | Electricity | 30 | X | 19 | X | | | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | | | | |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | |
| | 5 | Electricity | 30 | X | 19 | X | X | | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | | | | |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | |
| | 6 | Electricity | 30 | X | 19 | X | X | | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | | | | |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | |
| | 7 | Electricity | 38 | X | 19 | X | X | | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | X | | | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | |
| | 8 | Electricity | 38 | X | 19 | X | X | | | | |
| | | Gas | 38 | X | 19 | X | X | | | | |
| | | Oil | 38 | X | 19 | X | X | X | | | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | |
| Pennsylvania | 5 | Electricity | 30 | X | 19 | X | X | X | | | x |
| | | Gas | 30 | X | 11 | X | | | | | x |
| | | Oil | 30 | X | 11 | X | | X | | | x |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | x |
| | 6 | Electricity | 30 | X | 19 | X | X | X | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | | | | |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | |
| | 7 | Electricity | 38 | X | 19 | X | X | X | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | | | | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | |
| | ■ | Electricity | 38 | X | 19 | X | X | | | | x |
| | | Gas | 38 | X | 19 | X | X | | | | x |
| | | Oil | 38 | X | 19 | X | X | | | | ■ |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | ■ |

NOTE: 1 = Single-family 2 = Attached buildings 3 = Mobile Homes

*These R-Values are minimums. The State may propose, in a State Plan, either (1) to substitute a higher level, subject to the Assistant Secretary's approval, as the program measure, or (2) to offer other levels (higher or lower) as States measures in addition to the program measures.

| STATE | HUD/MPS REGION | CATEGORY OF RESIDENTIAL BUILDING | CONSERVATION MEASURES | | | | | RENEWABLE RESOURCE MEASURES | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ceiling Insulation (R-Value)* | Wall Insulation | Floor Insulation (R-Value)* | Storm or Thermal Windows | Storm or Thermal Doors | Solar Domestic Hot Water Systems | Active Solar Space Heating Systems | Combined Active Solar Space Heating & Solar Domestic Hot Water Systems | Wind Energy Devices |
| Rhode Island | 6 | Electricity | 30 | X | 19 | X | X | x | | | x |
| | | Gas | 30 | X | 11 | X | | | | | x |
| | | Oil | 30 | X | 11 | X | | | | | x |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | x |
| South Carolina | 2 | Electricity | 22 | X | | X | | x | | | x |
| | | Gas | 19 | X | | | | | | | |
| | | Oil | 19 | X | | | | x | | | |
| | | Electric Heat Pump | 19 | X | | | | | | | |
| | 3 | Electricity | 30 | X | 11 | X | | x | | | x |
| | | Gas | 22 | X | | | | | | | |
| | | Oil | 22 | X | | | | x | | | |
| | | Electric Heat Pump | 22 | X | | | | | | | x |
| | 4 | Electricity | 30 | X | 19 | X | | x | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | x | | | |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | |
| South Dakota | 7 | Electricity | 38 | X | 19 | X | X | x | | | x |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | x | | | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | x |
| | 8 | Electricity | 38 | X | 19 | X | X | x | | | x |
| | | Gas | 38 | X | 19 | X | X | | | | |
| | | Oil | 38 | X | 19 | X | X | x | | | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | x |
| Tennessee | 3 | Electricity | 30 | X | 11 | X | | x | | | |
| | | Gas | 22 | X | | | | | | | |
| | | Oil | 22 | X | | | | x | | | |
| | | Electric Heat Pump | 22 | X | | | | | | | |
| | 4 | Electricity | 30 | X | 19 | X | | | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | x | | | |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | |
| | 5 | Electricity | 30 | X | 19 | X | X | | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | x | | | |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | |
| Texas | 1 | Electricity | 19 | X | | | | x | | | x |
| | | Gas | 19 | X | | | | | | | |
| | | Oil | 19 | X | | | | x | | | |
| | | Electric Heat Pump | 19 | X | | | | | | | x |

NOTE: 1 = Single-family 2 = Attached buildings 3 = Mobile Homes

*These R-Values are minimums. The State may propose, in a State Plan, either (1) to substitute a higher level, subject to the Assistant Secretary's approval, as the program measure, or (2) to offer other levels (higher or lower) as States measures in addition to the program measures.

| STATE | HUD/MPS REGION | CATEGORY OF RESIDENTIAL BUILDING | CONSERVATION MEASURES | | | | | RENEWABLE RESOURCE MEASURES | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ceiling Insulation (R-Value)* | Wall Insulation | Floor Insulation (R-Value)* | Storm or Thermal Windows | Storm or Thermal Doors | Solar Domestic Hot Water Systems | Active Solar Space Heating Systems | Combined Active Solar Space Heating & Solar Domestic Hot Water Systems | Wind Energy Devices |
| Texas (Continued) | 2 | Electricity | 22 | X | | X | | x | | 1,2 | x |
| | | Gas | 19 | X | | | | x | | | x |
| | | Oil | 19 | X | | | | x | | | x |
| | | Electric Heat Pump | 19 | X | | | | | | | x |
| | 3 | Electricity | 30 | X | 11 | X | | x | | 1,2 | x |
| | | Gas | 22 | X | | | | | | | x |
| | | Oil | 22 | X | | | | x | | | x |
| | | Electric Heat Pump | 22 | X | | | | | | | x |
| | 4 | Electricity | 30 | X | 19 | X | | x | | 1,2 | x |
| | | Gas | 30 | X | 11 | X | | | | | x |
| | | Oil | 30 | X | 11 | X | | x | | | x |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | x |
| | 5 | Electricity | 30 | X | 19 | X | X | x | | 1,2 | x |
| | | Gas | 30 | X | 11 | X | | x | | | x |
| | | Oil | 30 | X | 11 | X | | x | | | x |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | x |
| Utah | 5 | Electricity | 30 | X | 19 | X | X | x 1,2 | | 1,2,3 | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | x 1,2 | | 1,2,3 | |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | |
| | 6 | Electricity | 30 | X | 19 | X | X | x 1,2 | | 1,2 | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | x 1,2 | | 1,2 | |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | |
| | 7 | Electricity | 38 | X | 19 | X | X | x 1,2 | | 1,2 | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | x 1,2 | | 1,2 | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | |
| | 8 | Electricity | 38 | X | 19 | X | X | x 1 | | 1 | |
| | | Gas | 38 | X | 19 | X | X | | | | |
| | | Oil | 38 | X | 19 | X | X | x 1 | | 1 | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | |
| Vermont | 7 | Electricity | 38 | X | 19 | X | X | | | | x |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | | | | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | x |
| | 8 | Electricity | 38 | X | 19 | X | X | | | | |
| | | Gas | 38 | X | 19 | X | X | | | | |
| | | Oil | 38 | X | 19 | X | X | | | | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | |

NOTE: 1 = Single-family 2 = Attached buildings 3 = Mobile Homes

*These R-Values are minimums. The State may propose, in a State Plan, either (1) to substitute a higher level, subject to the Assistant Secretary's approval, as the program measure, or (2) to offer other levels (higher or lower) as States measures in addition to the program measures.

| STATE | HUD/MPS REGION | CATEGORY OF RESIDENTIAL BUILDING | CONSERVATION MEASURES | | | | | RENEWABLE RESOURCE MEASURES | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ceiling Insulation (R-Value)* | Wall Insulation | Floor Insulation (R-Value)* | Storm or Thermal Windows | Storm or Thermal Doors | Solar Domestic Hot Water Systems | Active Solar Space Heating Systems | Combined Active Solar Space Heating & Solar Domestic Hot Water Systems | Wind Energy Devices |
| Virginia | 3 | Electricity | 30 | X | 11 | X | | x | | | x |
| | | Gas | 22 | X | | | | | | | x |
| | | Oil | 22 | X | | | | x | | | x |
| | | Electric Heat Pump | 22 | X | | | | | | | x |
| | 4 | Electricity | 30 | X | 19 | X | | x | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | x | | | |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | |
| | 5 | Electricity | 30 | X | 19 | X | X | x | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | x | | | |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | |
| | 6 | Electricity | 30 | X | 19 | X | X | x | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | x | | | |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | |
| Washington | 6 | Electricity | 30 | X | 19 | X | X | | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | | | | |
| | | Electric Heat Pump | 30 | X | 19 | X | X | | | | |
| | 7 | Electricity | 38 | X | 19 | X | X | | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | | | | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | |
| | 8 | Electricity | 38 | X | 19 | X | X | | | | |
| | | Gas | 38 | X | 19 | X | X | | | | |
| | | Oil | 38 | X | 19 | X | X | x | | | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | |
| West Virginia | 5 | Electricity | 30 | X | 19 | X | X | x | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | | | | |
| | | Electric Heat Pump | 30 | X | 11 | X | | | | | |
| | 6 | Electricity | 30 | X | 19 | X | X | x | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | | | | |
| | | Electric Heat Pump | 30 | X | 19 | X | X | x | | | |
| Wisconsin | 7 | Electricity | 38 | X | 19 | X | X | x | | | x |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | | | | x |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | |

NOTE: 1 = Single-family 2 = Attached buildings 3 = Mobile Homes

*These R-Values are minimums. The State may propose, in a State Plan, either (1) to substitute a higher level, subject to the Assistant Secretary's approval, as the program measure, or (2) to offer other levels (higher or lower) as States measures in addition to the program measures.

| STATE | HUD/MPS REGION | CATEGORY OF RESIDENTIAL BUILDING | CONSERVATION MEASURES | | | | | RENEWABLE RESOURCE MEASURES | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ceiling Insulation (R-Value)* | Wall Insulation | Floor Insulation (R-Value)* | Storm or Thermal Windows | Storm or Thermal Doors | Solar Domestic Hot Water Systems | Active Solar Space Heating Systems | Combined Active Solar Space Heating & Solar Domestic Hot Water Systems | Wind Energy Devices |
| Wisconsin (Continued) | 8 | Electricity | 38 | X | 19 | X | X | | | | x |
| | | Gas | 38 | X | 19 | X | X | | | | x |
| | | Oil | 38 | X | 19 | X | X | | | | x |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | x |
| Wyoming | 7 | Electricity | 38 | X | 19 | X | X | | | | |
| | | Gas | 30 | X | 11 | X | | | | | |
| | | Oil | 30 | X | 11 | X | | x 1 | | 1 | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | |
| | 8 | Electricity | 38 | X | 19 | X | X | | | | x |
| | | Gas | 38 | X | 19 | X | X | | | | |
| | | Oil | 38 | X | 19 | X | X | x 1 | | 1 | |
| | | Electric Heat Pump | 38 | X | 19 | X | X | | | | x |
| Puerto Rico | 1 | Electricity | 19 | X | | | | x | | | x |
| | | Gas | 19 | X | | | | x | | | x |
| | | Oil | 19 | X | | | | x | | | x |
| | | Electric Heat Pump | 19 | X | | | | | | | x |

NOTE: 1 = Single-family 2 = Attached buildings 3 = Mobile Homes

*These R-Values are minimums. The State may propose, in a State Plan, either (1) to substitute a higher level, subject to the Assistant Secretary's approval, as the program measure, or (2) to offer other levels (higher or lower) as States measures in addition to the program measures.

BILLING CODE 6450-01-C

**Appendix to Part 456—Standard Incorporated by Reference**

(a) Incorporation by reference of material and installation standards. The material and installation standards identified herein are hereby incorporated by reference into this Part as though set forth in full herein, pursuant to 5 U.S.C. § 552(a).

Incorporation by reference of material and installation standards in 10 CFR Part 456 is approved by the Director of the Federal Register, November 1, 1979.

(b) Statement of availability.

(1) Copies of the following standards may be obtained at the following addresses:

- American National Standards Institute (ANSI), 1430 Broadway, New York, New York 10018
- American Society of Testing and Materials (ASTM), 1916 Race Street, Philadelphia, PA 19103
- National Fire Prevention Administration (NFPA), 470 Atlantic Avenue, Boston, MA 02210
- Environmental Protection Agency (EPA), Washington, D.C.
- U.S. Department of Commerce, National Bureau of Standards (NBS), Washington, D.C. 20234
- Building Officials and Code Administrators (BOCA), International, Inc., 1313 E. 60th Street, Chicago, IL 60637
- Underwriters Laboratory (UL), 207 E. Ohio Street, Chicago, IL 60611
- Fir and Hemlock Door Association (FHDA), Yeon Building, Portland, OR 97204
- Superintendent of Documents, Government Printing Office (GPO), Washington, D.C. 20402
- Department of Housing and Urban Development (HUD), Office of Technical and Credit Standards, Room 6156, 451 7th Street, S.W., Washington, D.C. 20410

(2) Copies of all standards incorporated by references are available for inspection in the DOE Reading Room, Room GA–152, Forrestal Building, 1000 Independence Avenue, S.W., Washington, D.C. between the hours of 8:00 a.m. and 4:30 p.m., Monday through Friday.

(c) Changes in material and installation standards. Any change to any material on installation standard will be made in accordance with statutory requirements for notice and public comment and with DOE policy for the adoption of rules. Notice of any proposed change will be published in the **Federal Register** and reflected as an amendment to the table in paragraph (d).

(d) Table of Standards incorporated by reference.

**Table of Standards [1]**

| Number | Title | Date approved | Section reference |
|---|---|---|---|
| ANSI: | | | |
| ANSI/AAMA 1002.9–1977 | "Voluntary Specification for Aluminum Combination Storm Windows for External Applications". | Nov. 1, 1979 | § 456.813. |
| ANSI/AAMA 1102.7–1977 | "Voluntary Specifications for Aluminum Storm Doors" | Nov. 1, 1979 | § 456.813. |
| ANSI/ASTM D 2156–65 (1975) | "ANSI Standard Method of Tests for Smoke Density in the Flue Gases from Distillate Fuels". | Nov. 1, 1979 | § 456.913. |
| ANSI Z21.13–1977 | "Gas-fired Low Pressure Steam and Hot Water Heating Boilers" | Nov. 1, 1979 | § 456.814. |
| ANSI Z21.20–1975 | "ANSI Standard for Automatic Gas Ignition Systems and Components" | Nov. 1, 1979 | § 456.814. |
| ANSI Z21.47–1978 | "ANSI Standard for Gas-fired Central Furnaces" | Nov. 1, 1979 | § 456.814. |
| ANSI Z21.59–1974 | "Gas-fired High Pressure Steam and Hot Water Heating Boilers" | Nov. 1, 1979 | § 456.814. |
| ANSI Z21.66–1977 | "ANSI Standard for Electrically-Operated Automatic Vent Damper Devices for Use with Gas-fired Appliances". | Nov. 1, 1979 | § 456.814. |
| ANSI Z21.67–1978 | "ANSI Standard for Mechanically-Actuated Automatic Vent Damper Devices for Use with Gas-fired Appliances". | Nov. 1, 1979 | § 456.814. |
| ANSI Z21.68–1978 | "ANSI Standard for Thermally-Actuated Automatic Vent Damper Devices for Use with Gas-fired Appliances". | Nov. 1, 1979 | § 456.814. |
| ANSI Z91.2–1976 | "Performance Requirements for Automatic Pressure Oil Burners of the Mechanical Draft Type". | Nov. 1, 1979 | § 456.814 and § 456.913. |
| ANSI Z96.1–1978/UL 727 | "Oil-fired Central Furnaces" | Nov. 1, 1979 | § 456.814. |
| ANSI Z96.2–1974/UL 296 | "Oil Burners" | Nov. 1, 1979 | § 456.814. |
| ANSI Z96.3–1975/UL 726 | "Oil-fired Boiler Assemblies" | Nov. 1, 1979 | § 456.814. |
| ANSI/NWMA I.S. 2–73 | "Industry Standard for Wood Windows" | Nov. 1, 1979 | § 456.813. |
| ANSI/NWMA I.S. 5–73 | "Ponderosa Pine Doors" | Nov. 1, 1979 | § 456.813. |
| ASTM: | | | |
| ASTM C–516 | "Standard Specification for Vermiculite Loose Fill" | Nov. 1, 1979 | § 456.806. |
| ASTM C–520 | "Standard Method for Density of Granular Loose-fill Insulation" | Nov. 1, 1979 | § 456.806 and § 456.807. |
| ASTM C–570–72 | "Specification for Oil and Resin Based Caulking Compound for Building Construction" | Nov. 1, 1979 | § 456.812. |
| ASTM C–578 | "Standard Specification for Preformed, Block-Type Cellular Polystyrene Thermal Insulation". | Nov. 1, 1979 | § 456.808. |
| ASTM C–755–73 | "Standard Recommended Practice for Selection for Vapor Barriers for Thermal Insulation". | Nov. 1, 1979 | § 456.903. |
| ASTM C–834–76 | "Specification for Latex Ceiling Compounds" | Nov. 1, 1979 | § 456.812. |
| ASTM E–84 | "Standard Test Method for Surface Burning Characteristics of Building Materials" | Nov. 1, 1979 | § 456.808, § 456.809, and § 456.812. |
| ASTM E–96 | "Standard Test Method for Water Vapor Transmission of Materials in Sheet form" | Nov. 1, 1979 | § 456.805. |
| ASTM E–119–76 | "Standard Methods of Fire Tests of Building Constructon and Materials" | Nov. 1, 1979 | § 456.906 and § 456.907. |
| ASTM E–136–79 | "Test for Non-Combustibility of Elementary Materials" | Nov. 1, 1979 | § 456.905 and § 456.906. |
| ASTM E–283–73 | "Standard Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors". | Nov. 1, 1979 | § 456.813. |
| ASTM E–576–76 | "Standard Test Method for Dew/frost Point of Sealed-Insulating Glass Units in Vertical Position". | Nov. 1, 1979 | § 456.813. |
| BOCA: BOCA Research Report No. 72–33 | | Nov. 1, 1979 | § 456.813. |
| EPA: EPA Report No. 600/2–75–069a | "Guidelines for Residential Oil Burner Adjustments" | Nov. 1, 1979 | § 456.913. |
| Federal Specifications: | | | |
| HH–I–515 D | "Insulation, Thermal (loose-fill for Pneumatic or Poured Application): Cellulosic or Wood fiber". | Nov. 1, 1979 | § 456.803, § 456.804, and § 456.805. |
| HH–I–524 B | "Insulation Board, Thermal (Polystyrene)" | Nov. 1, 1979 | § 456.808. |
| HH–I–530 A | "Insulation Board, Thermal (Polyurethane and Polyisocyanurate)" | Nov. 1, 1979 | § 456.809. |
| HH–I–558 B | "Insulation Blocks, Boards, Blankets, Felts, Sleeving, and Pipe Fitting Coverings" | Nov. 1, 1979 | § 456.812. |
| HH–I–574 B | "Insulation, Thermal (Perlite)" | Nov. 1, 1979 | § 456.807. |
| HH–I–585 C | "Insulation, Thermal (Vermiculite)" | Nov. 1, 1979 | § 456.806. |
| HH–I–1030 A | "Insulation, Thermal (Mineral Fiber for Pneumatic or Poured Application)" | Nov. 1, 1979 | § 456.804 and § 456.805. |
| HH–I–1252 B | "Insulation, Thermal Reflective (Aluminum Foil)" | Nov. 1, 1979 | § 456.810. |
| TT–S–001543 A | "Ceiling Compound, Silicone Rubber Base, (for Caulking, Sealing, and Glazing in Buildings and Other Structures)". | Nov. 1, 1979 | § 456.812. |
| TT–S–00227 E | "Ceiling Compound, Elastomeric Type, Multi-Component (for Caulking, Sealing, and Glazing in Buildings and Other Structures)". | Nov. 1, 1979 | § 456.812. |
| TT–S–001657 | "Ceiling Compound, Single Component Butyl Rubber Base, Solvent Release Type (for Buildings and Other Types of Construction)". | Nov. 1, 1979 | § 456.812. |
| TT–S–00230 C | "Ceiling Compound, Elastomeric Type, Single-Component, (for Caulking, Sealing and Glazing in Buildings, and other Structures)". | Nov. 1, 1979 | § 456.812. |

**Table of Standards [1]—Continued**

| Number | Title | Date approved | Section reference |
|---|---|---|---|
| TT-C-00598 C | "Caulking Compound, Oil and Resin Base Type (for Building Construction)" | Nov. 1, 1979 | § 456.812. |
| TT-P-00791 B | "Putty linseed-oil Type, (for Wood-Sash-Glazing)" | Nov. 1, 1979 | § 456.812. |
| FHDA: FHDA 6-77 | "Industry Standard for Douglas Fir, Western Hemlock, and Sitka Spruce Doors and Blinds". | Nov. 1, 1979 | § 456.813. |
| HUD: HUD Intermediate MPS Supplement 4930.2. | "Solar Heating and Domestic Hot Water Systems" | Nov. 1, 1979 | § 456.702. |
| NBS: NBS/PS 26-70 | "Rigid Polyvinyl-Chloride Profile Extrusions" | Nov. 1, 1979 | § 456.813. |
| NFPA: | | | |
| NFPA-31 | "Standard for the Installation of Oil Burning Equipment" | Nov. 1, 1979 | § 456.905, § 456.906, § 456.907, and § 456.913. |
| NFPA-54 | "National Fuel Gas Code" | Nov. 1, 1979 | § 456.905, § 456.906, and § 456.907. |
| NFPA-211 | "Standard for Chimneys, Fireplaces, and Vents" | Nov. 1, 1979 | § 456.905, § 456.906, § 456.907, and § 456.912. |
| UL: UL 599 | "Standard for Heat Pumps" | Nov. 1, 1979 | § 456.814. |

[1] All material and installation requirements are contained in Subparts G, H, and I.

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